FOOD ENGINEERING

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November 1952

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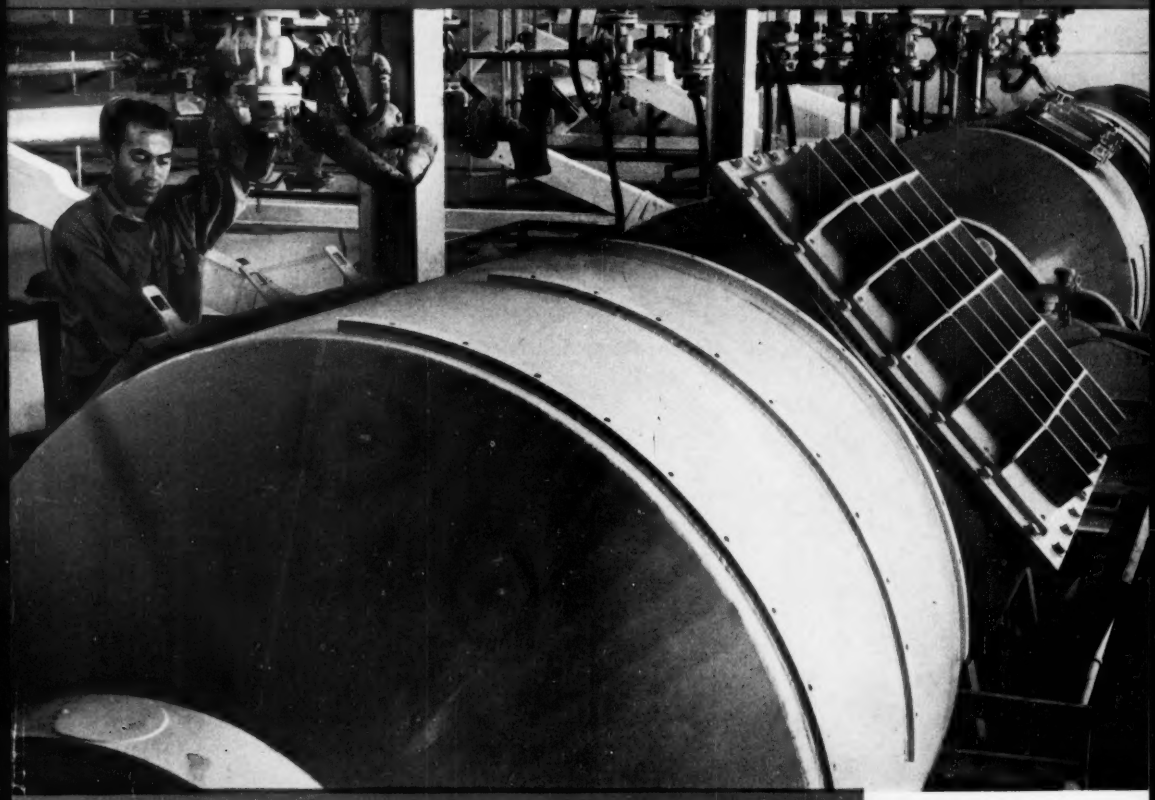

RUBBER-LINED pectin washers in new lemon-products plant. Vacuum empties drums through filter on flat side. (P. 87)

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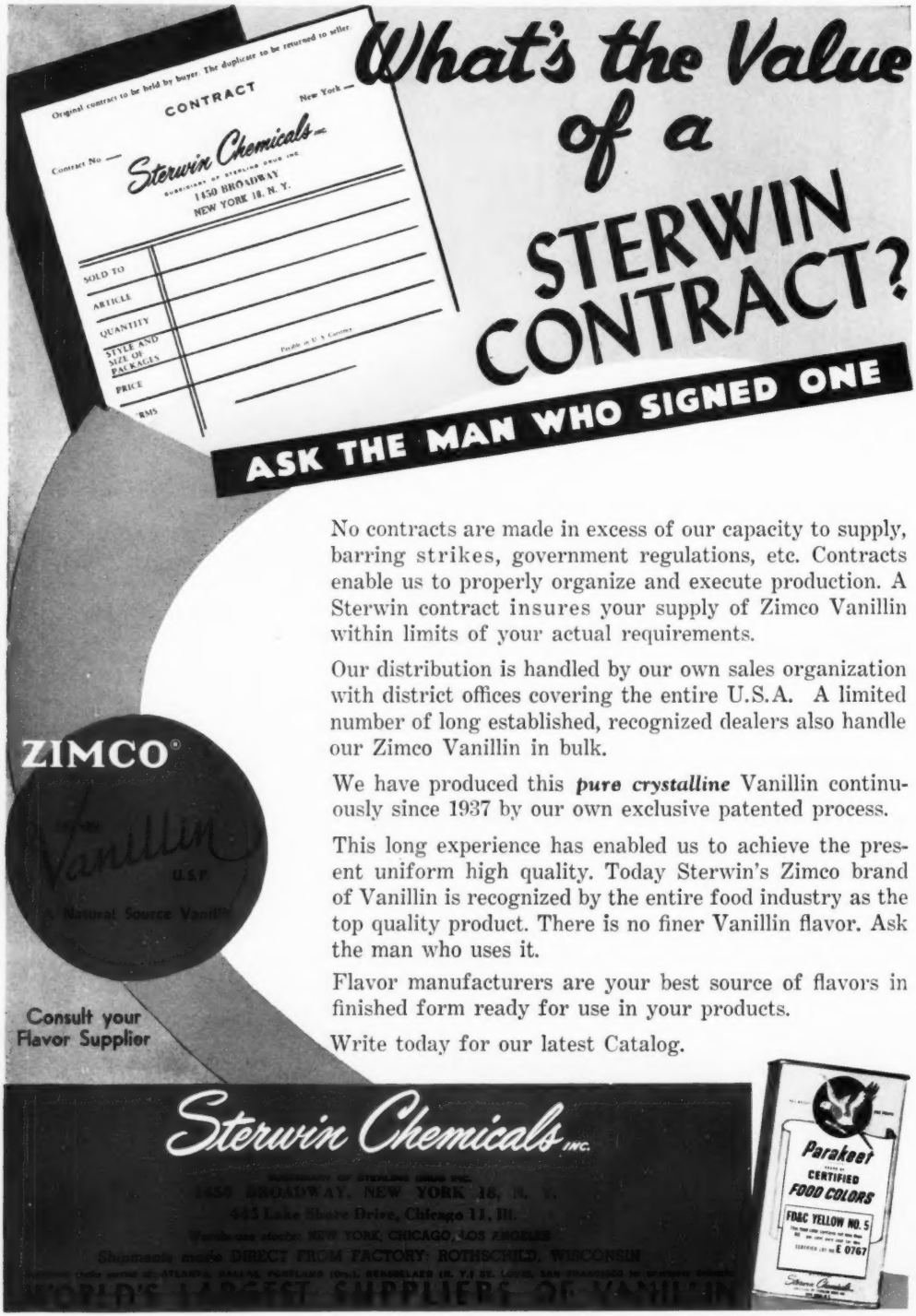
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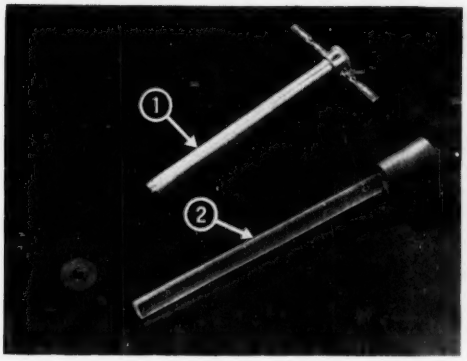
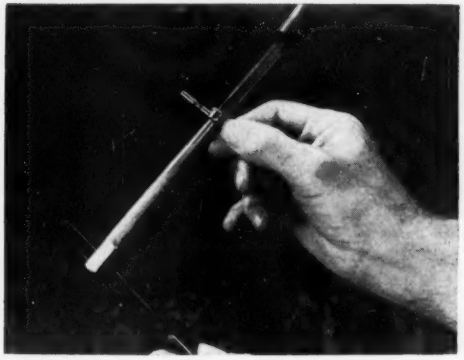
PRACTICAL IDEAS





Device Speeds Sampling "By Weight"

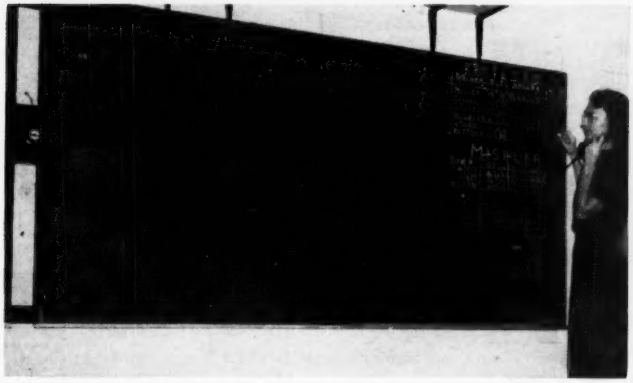
A butter and cheese sampler, developed by the Department of Dairy Industry, Cornell University, Ithaca, N. Y. delivers a test portion, accurate within 2 percent of the weight desired. Thus for many determinations of phosphatase and bacterial population, analytical testing is speeded and weighing of sample by the old balance method avoided.

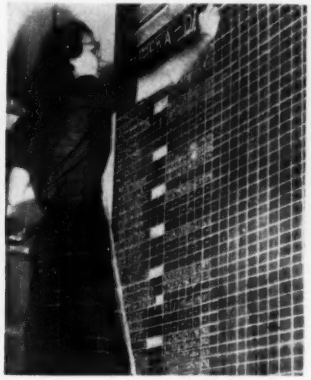
The outside of the sampler is a metal cylinder—1 in left photo—such as a cork-borer, with smooth internal surface. Into this is inserted a close fitting glass rod, (2), calibrated according to known specific gravity of product to be sampled. Etched graduation-marks correspond to ½ to 1 gm. samples in the case of cheese, 1 to 5 gm. samples in the case of butter.

A definite-weight sample is obtained by forcing the sharp end of the outer shell into the product, until the desired weight shown on the graduated glass piston has been exceeded. Then with a circular motion the cylinder is withdrawn from the product and the piston pushed into the cylinder until desired graduation mark is flush with top edge of metal cylinder (see right photo).

Excess, extruded from cylinder is sliced away with wire or spatula, and the remainder of the sample within the tube extruded into a dish or other receptical. Portions of sample adhering to the glass rod are scraped off on the inner edge of receptical.

Sampler may be applied to other solid foods to provide a representative cross section of the product. Since this method of sampling is rapid—approximately 10 sec. per operation—chances of any drying of sample before testing, are minimized. Where a sample of more accurate weight is necessary, sampler can provide a close approximation of the required weight and thereby reduce weighing time.—*F. V. Kosikowsky, Cornell University, Ithaca, N. Y.*





Data Clearing-House Pays

During the packing season a cannery can put a heavy afternoon session at the board of trade to shame. Countless trips are made by office and plant workers—back and forth and criss-cross through the plant running down yields, labor indexes and all those vital bits of information.

To bring order to this conventional chaos, a central control room or information clearing house was set up at Libby-McNeill, & Libby's Eureka, Ill. cannery.

All vital statistics are now phoned in and tabulated on blackboards (see left photo) in this control room. Here, with one college trained girl to work out statistics and log data, a new order and speed has come to the cannery.

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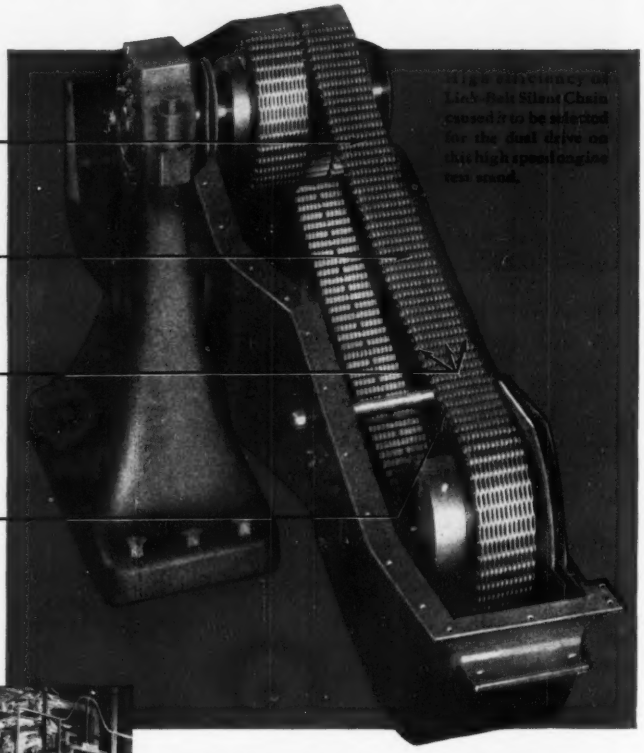

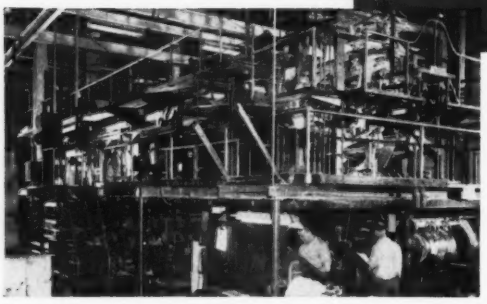

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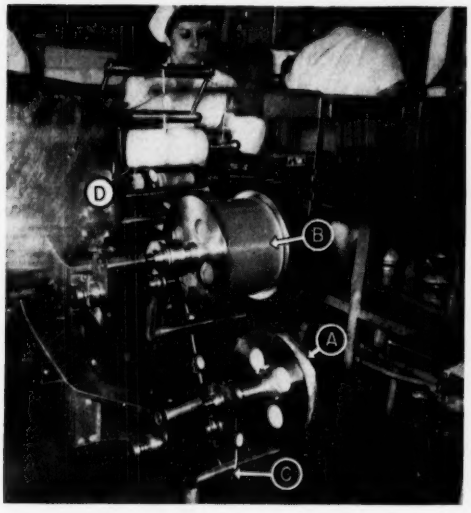
Most helpful aspect of the control room is its ability to pinpoint man-hour requirements. With crop quality readings and harvesting data listed, it is a simple matter, as an example, to size up the number of people needed on a trim line in the plant.

Other data on the five boards (right photo) in this room includes production losses, labor turnover, lost time by accidents, fill lines running, yields, etc. And not only is this information put to spot use, it also serves for analysis and improvement when daily production meetings are held by key personnel in the room.—*Shirley Hutchinson, Editor, Libby's "Scanner".*



Thousands Saved on Printed Film

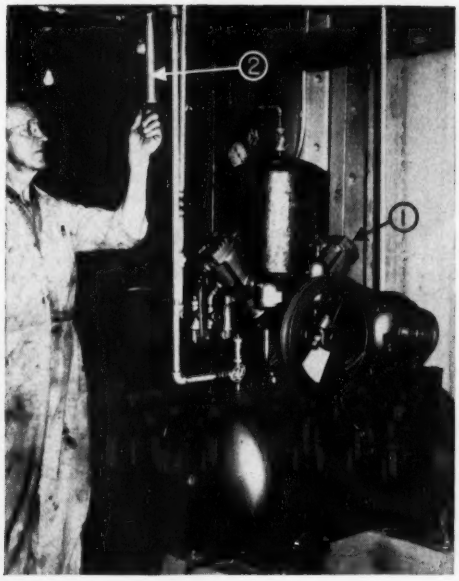
By heat-sealing a narrow ribbon of printed cellophane onto our ice cream sandwich wrapper, we effected savings that amount to thousands of dollars annually.

During the time the ice cream sandwiches was in the development stage it was packaged by wrapping and heat-sealing in plain cellophane. When this period ended, we wanted to identify the product by brand name, colorfully printed on the wrapper.

All that was needed to meet our needs, was a band of printing about an inch wide at the center of the sheet from which the wrapper was continuously formed. When we investigated, we learned the cost of printing rolls of cellophane is based on the weight of the roll, regardless of the amount of printing. But all we needed was a strip of printing about an inch wide.

So, we had our label printed on a narrow cellophane ribbon and mounted on the roll—(A) in photo—on a separate shaft, centered with the roll of unprinted cellophane (B), and added the counterbalance (C) to control the uniformity of feed.

When the printed ribbon and plain sheet have passed through a heat-sealer (D) the two adhere. Wrapper is strengthened by the printed ribbon and also total printed wrapper cost is far less than it would have been if the label had been printed on the wrapper.—*Wm E. Reichert, Indus. Eng. Dept., Abbotts Dairies, Inc., Philadelphia.*



Saves 100 Production Hours Yearly

Ended was the almost-every-day maintenance of overrun-compressors at Erie County Milk Assn., Erie, Pa., when air for ice cream freezers was supplied from a single unit.

Since air for overrun in ice cream manufacture must be clean and free of lubricating oil or other odor and taste producing impurities, each freezer was equipped with its own small diaphram-type air compressor. Almost every day one of these reqiured maintenance. Production suffered while repairs were made and many man hours were lost.

Then, installed to replace the four diaphram pumps, was a single air-cooled, V-type Ingersoll-Rand self lubricating compressor—(1) in photo. Driven by a 3 hp. induction motor, this compressor has proven adequate for the 750 gal. per hr. capacity of our four ice cream freezers.

Possibility of contamination of ice cream by lubricating oil from the single reciprocating compressor, is avoided by use of piston rings of graphitic carbon. Since these eliminate metal to metal contact, no oil is required for piston ring lubrication. Cylinders are sealed from crankcase, preventing the possibility of air contamination from this source.

Two other clean-air precautions were taken. To prevent the formation of rust or other corrosive action, only sanitary pipe was used on lines from the air tank to the freezers. Also, air passes through a sanitary filter (2) as it leaves the tank.

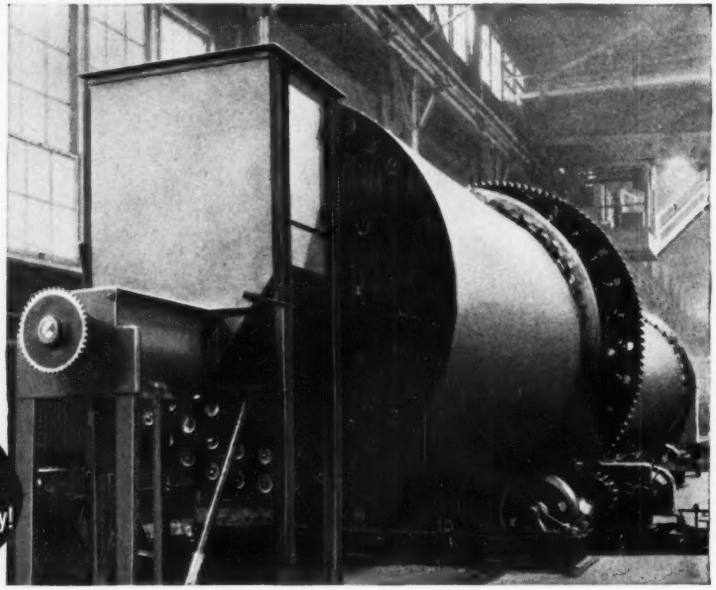
Compact compressor unit is mounted on its own tank from which air is piped to all four freezers. Tank pressure is automatically maintained at 60 psi. Controlled by hand-set regulators, pressure at freezers can be varied between 15 and 40 psi., as required.

A. S. Fogelbach, Erie's chief engineer, reports that not once during the three years use of the reciprocating air compressor has there been a single forced shut-down for compressor maintenance—an estimated saving of at least 100 hr. of production per year, and many times that number of man hours.

See Louisville for

CREATIVE DRYING ENGINEERING

LOUISVILLE ROTARY DRYERS utilize 85% of all available heat in steam!



KNOW THE RESULTS before you buy!

Extremely high thermal efficiency is just one of the basic engineering advantages of Louisville steam tube Dryers. Any danger of case hardening is eliminated. Because of a very low air flow, finely divided material lost from the dryer cylinder is relatively small even though dryer may be handling unusually dusty material. Arrangements are included in each Louisville Dryer for complete and continuous removal of condensed steam . . . a unique steam joint eliminates all thrust bearings.

Louisville Dryers are safe, automatic and economical. They require a minimum of labor, supervision and maintenance . . . and are carefully built for years of dependable service.

Write for new treatise on rotary dryers. Or call in a Louisville engineer. Have him look over your drying operation. Possibly a "predetermined", job-fitted Louisville Dryer can turn a losing operation into a profit maker.

Ask for new treatise on subject of rotary dryers

Other General American Equipment:

Turbo-Mixers, Evaporators, Dewaterers, Towers, Tanks, Bins, Filters, Pressure Vessels

PROCESS EQUIPMENT DIVISION GENERAL AMERICAN TRADE MARK

Louisville Drying Machinery Unit

Over 50 years of creative drying engineering

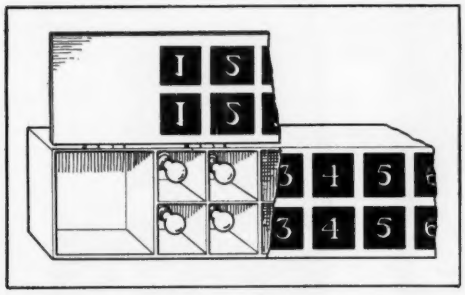
GENERAL AMERICAN TRANSPORTATION CORPORATION

Dryer Sales Office: Hoffman Bldg., 139 So. Fourth Street, Louisville 2, Kentucky

General Offices: 135 South La Salle Street, Chicago 90, Illinois

Offices in all principal cities

In Canada: Canadian Locomotive Company, Ltd., Kingston, Ontario



Panel Shows Roof-Condensers in Operation

By fabricating an indicator of thin-gage sheet metal and glass translucent house-numbers, we have greatly simplified engine-room procedure.

Refrigeration compressors at our plant are installed on the ground floor, while the seven evaporation-type ammonia condensers are located on the roof 4 floors above compressor room level.

Before the indicator was installed, engine-room operators never knew for certain how many of the condensers were in operation at the moment. Now, they know at all times which are in operation and therefore can quickly determine the cause of any excessive head-pressure and make proper corrections.

This is how the indicator is constructed and how it functions.

The assembly is housed in a long metal box (see photo), divided into two rows of compartments, ten to a row. In each, is a small electric light (see sketch) individually wired to the starter of each evaporator-condenser blower-motor and pump-motor.

Depth of each light chamber is about 3 in., just sufficient for housing the lamp. Other dimensions are determined by the size of glass house-numbers used as compartment fronts. Access to the inside for replacement of burned out lamps is gained by lifting the front which is hinged at its upper edge.

Visibility of glass numerals, which are obtainable at hardware and dime stores, is excellent because the background is painted black. Any lighted number is then readily seen the full length of a large engine room, so that operators always know which condensers are in operation and can thereby check performance of compressors, phoning directions for any needed condenser changes.—*Erik W. Holgren, Chief Engineer, Abbotts Dairies, Inc., Ice Cream Div., Philadelphia.*

$50 Extra for Best Item

You are invited to submit Practical Ideas. You will be paid at regular rates when your item is printed and if it is judged best for the month you will get an additional payment of $50.

Selection of the best contributed item will be made by a group of 200 readers each month, and the item title and author's name will be cited (see below).

Practical Ideas may describe any type of device or method recently developed to solve a problem, speed an operation, or make some task easier. They may concern factory, laboratory, warehouse, or power-plant operations in the food industry. Ideas on management, maintenance, and trucking or shipping also are suitable.

You need not be an experienced writer or draftsman to submit these ideas. The text will be edited and sketches converted to finished drawings.

Send your items to: Practical Ideas Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.

SEPTEMBER PRACTICAL IDEA voted best was "Counterweight Ends Trap-Door Hazard", submitted by D. B. Bradshaw, H. A. Johnson Co., Boston. Described was a method of counterbalancing a heavy, unwieldly trap door giving access to the plant roof. Device not only made door easier to operate, but also removed an accident hazard.

Way to Mend Stainless Tank Leaks

All our attempts to stop leaks in stainless steel tanks used for storage of brine, were futile until we adopted the procedure now used.

Most leaks occurred at welded seams, where at first the holes formed by action of the salt solution were pinpoint in size. However, initial seepages soon grew to trickles which were not prevented even by welding the leaky area.

Now, as soon as any leak is discovered, the tank is drained, and drilled at the place where brine has escaped. The hole is made sufficiently large for passage of a ¼ in. stainless steel bolt.

Rubber or Neoprene gaskets, backed by metal washers, are placed on each side of the hole and compressed by tightening the nut (see photo) on the bolt end outside of the tank.

This method is not only faster and less costly than welding, but also closes leaks more satisfactorily.—*W. A. Free Jr., Hungerford Packing Co., Hungerford, Pa.*

WHEN *Split Second* PACKAGING IS ESSENTIAL..

USE *Paisley* RESIN ADHESIVES

Think of having at YOUR command, stable *laboratory controlled,* prepared Liquid Resin Adhesives that *set in split seconds* . . . timed to match machine motions with exacting mechanical precision! They will give you an entirely new conception of speed and efficiency in any packaging, labeling, sealing, fabricating or manufacturing operation.

All users of Resin Adhesives *need* the new Paisley Resin Adhesive Bulletin No. 23. It will give you practical, *usable* information never before available to Resin Adhesive users. Valuable technical aspects are explained in language any layman can understand. No cost or obligation is involved. Be sure to use your company letterhead when writing for your copy.

TEAR OUT . . FASTEN TO LETTERHEAD AND MAIL TODAY!

PAISLEY PRODUCTS INC., 1770 Canalport Ave., Chicago 16, Ill.

Gentlemen: Without obligation, please send me the new Paisley Technical Service Bulletin No. 23.

☐ We have a special Gluing problem. Send us your Adhesive Operation Data Sheet. (You fill in and return to us for Laboratory recommendation.)

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SALES OFFICES IN TWENTY-FIVE PRINCIPAL CITIES

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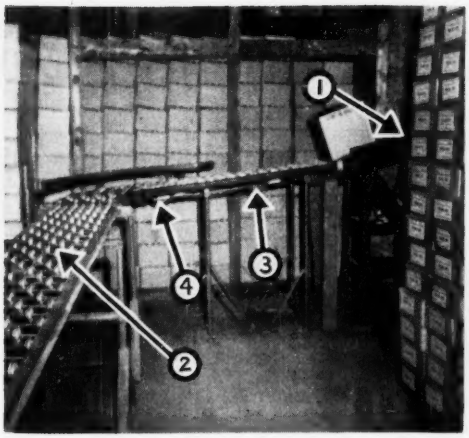
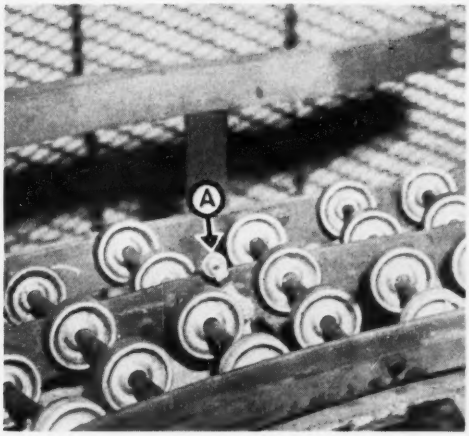




Controls End Conveyor Clogging

When a pair of limit switches was installed on a roller conveyor at Stickney & Poor Spice Co., Cambridge, Mass., carton congestion ended and resulting carton damage eliminated.

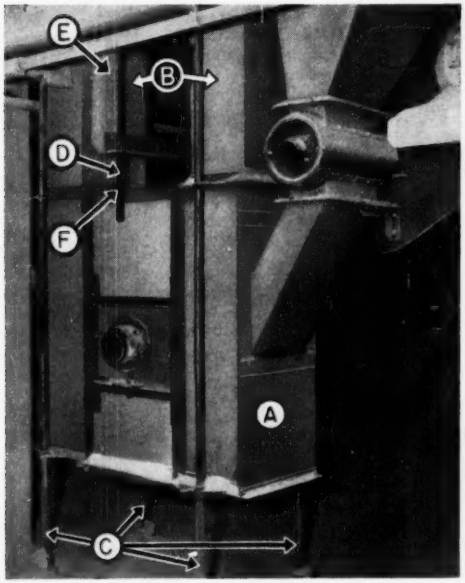
Cases are conveyed from the second floor, (where they are packed) to the ground floor by belt conveyor—(1) in left photo. From the belt, they move by gravity along a roller conveyor (2) to the station where they are loaded by hand onto trucks.

But when delays occured while cartons were trucked to loading dock or warehouse, cases not only backed up on the roller conveyor but also on the moving belt conveyor. Then, even if cases were not damaged by falling to the floor, injury was likely from the belt traveling against the bottoms of the stationary cartons. At the very least, the operator was pushed to load fast enough to empty the congested conveyor system.

Now, two limiting switches (3) and (4), wired in series, are attached to the roller conveyor, with distance between them approximately three times the length of a carton. Equipped with roller ends, the trips are hinged to the metal strip in the center of the conveyor.

A carton moving down the inclined rollers trips each switch in succession but does not interrupt the current. However, as cartons back up, both switches are tripped at the same time, stopping the conveyor belt before backed-up cartons reach it.

Removing cases from rollers clears the trip nearest the belt conveyor to again start it.—*R. F. Greenough, West Somerville, Mass.*



Belt Take-Up With Telescopic Boot

Tightening—to pick up slack—a multi-floor high bucket elevator, was a serious maintenance problem until we adopted a telescoping type of elevator boot.

And this device gave extra benefits. Not only did this adjustable boot minimize take-up problems but, in addition, the arrangement of the assembly made it easy to clean out the boot, and to clean under and around it as well.

Serving as support for the idler pulley and its bearings, as well as housing for the bottom of the elevator, the boot —(A) in photo—is constructed so as to telescope around the two upright housings (B), and is held in alignment and guided during adjustment by four rods (C) rigidly anchored in place.

Boot proper is suspended on two bolts (D) resting on an angle iron frame (E). Latter is firmly attached to the floor above.

When the new boot is to be adjusted vertically, to lengthen or shorten the elevator belt, lock nuts (F) on bolts (D) are loosened, and again tightened when adjustment is made.

Since the boot is suspended 1½ ft. or more from the floor, the cleanout door can be on the bottom, where it is not only possible to clean out the boot more thoroughly and with less effort, but the floor area beneath as well.—*A. F. Wenske, Assistant Superintendent of Maintenance, Eastern States Farmers Exchange, Buffalo.*

PRODUCT QUALITY IMPROVED
COSTS REDUCED WITH

STERLING SPEED-TROL!

Since installing Speed-Trols on our automatic candy brushing and polishing machines, reports J. R. Flanagan, Plant Engineer, Stephen F. Whitman & Son, Inc., manufacturers of Whitman's Chocolates, we have increased production... improved quality and appearance of our candy... decreased spoilage... and reduced maintenance and labor costs. These advantages result from Speed-Trol's accurate speed regulation, wide speed range and infinite speed variation, which permit synchronization of machine speed with the candy conveyor belt.

STERLING SPEED-TROL GIVES YOU VARIABLE SPEED CONTROL NECESSARY FOR:

EQUIPMENT ADAPTATION TO: Sequence synchronization—operators' abilities—load variations due to differences in quantity, quality, weight, size, tension, hardness or shape of material to be processed, machined, conveyed, blended, mixed, etc.

PROCESS CONTROL OF: Temperature—viscosity—level—pressure—flow—etc.

TIME CONTROL OF: Baking—drying—heating—cooking—pasteurizing—soaking—chemical action—etc.

With Speed-Trol you get the maximum in production, plant efficiency, quality and profit.

OTHER STERLING ELECTRIC POWER DRIVES:

- STERLING SLO-SPEED (GEARED) MOTORS
- STERLING KLOSD AND KLOSD-TITE (NORMAL SPEED) MOTORS

DRIP-PROOF • SPLASH-PROOF • TOTALLY ENCLOSED

70 ILLUSTRATIONS showing how Sterling Electric Power Drives reduce production costs. Write for Bulletin No. A 122

STERLING ELECTRIC MOTORS

Plants: New York City 51; Van Wert, Ohio; Los Angeles 22; Hamilton, Canada; Santiago, Chile.

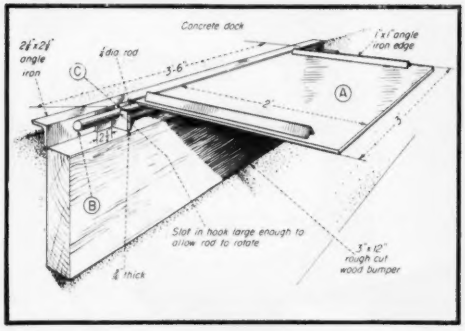
Offices and distributors in all principal cities.

Hydraulic Lift Cuts Worker Fatigue

Casing gallon-bottles at our plant has been speeded and the operation made less tiring for workers as the result of hydraulic lift installations at both ends of the packing table.

Wheeled to one end of the cartoning station on castored trucks, filled jugs of flavors are hydraulically elevated to table height by push-button control. Workers who easily slide jars from trucks along table, need not lift containers or stoop for them.

Cartons are filled and sealed, then slid off the table and onto a pallet at the opposite end. Level of loading surface is also kept at table height by push-button lowering of a second hydraulic lift. Again no lifting or stooping is necessary.—*L. Z. Mathany, Foote and Jenks, Jackson, Mich.*



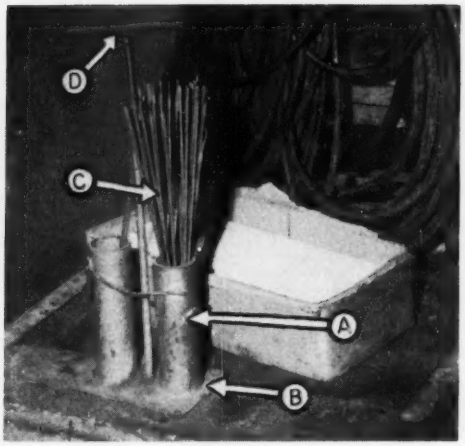
Portable Loading-Dock Board

Devised at our plant, for spanning the space between loading dock and trucks, was a portable hinged bridge which can be raised or lowered easily to compensate for varying levels of truck beds. It can also move sidewise to match truck doors and is removable from dock side.

Bridge proper is an angle iron, reinforced plate—(A) in sketch—2 ft. by 3 ft., welded to a ¾ in. rod (B). Latter pivots in slots in a 5 in. thick assembly (C) welded to the angle iron edge of the dock.

Since the portable bridge assembly of this type can be made smaller than conventional dock boards, it is light in weight and therefore easy to raise, lower, or transport.

Furthermore, separate loading zones can be installed merely by locating a pair of slotted assemblies about every 10 ft. along the dock.—*D. F. Mattson, Atkinson Milling Co., Minneapolis.*

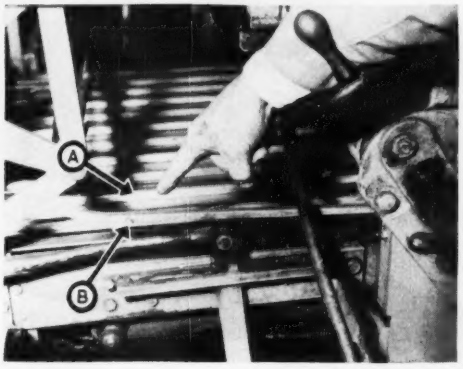


Easy-to-Make Welding-Rod Holder

From a couple of lengths of pipe, a small steel plate and metal bars we fabricated a welding rod carrier that is handy in use, prevents rods from straying and costs very little to construct.

Though we welded but two pieces of pipe—(A) in photo—to a plate (B) more holders can be assembled into a unit when it is necessary to carry a variety of rods.

From the plate bottom, which is made wide enough to provide stability to the holder, a rod (C) is extended and capped with a crossbar (D) to serve as handle for convenient transportation.—*H. F. Davis, Plant Engineer, Donahy-Faxon Stores, Inc., Buffalo.*



Guide Rails Prevent Miss-Fills

Feed of jars to our mayonnaise filler was none too dependable until we attached guides—(A) in photo—to keep the containers in line. Made of stainless steel bars, approximately ¾ in. square in cross section, guide rails are held in place by anchor rods (B) welded to them. These are inserted into holes drilled in the container runways.

A series of anchor holes are provided so that the distance between guides can be varied for several jar sizes.

Since the rails were added, containers are directed to correct positioning under filling spouts.—*Edward Schlorer, Production Manager, Mrs. Schlorer's Inc., Philadelphia.*

With this machine you put them on . . . FAST!
This is the machine that has made high volume sealing with Vacuum Lug Caps possible . . . and profitable. It is fast, completely automatic in operation, and flexible. It handles a wide range of jar sizes, cap sizes and products. Changing from one size cap, jar or both is simple . . . can be done in a matter of minutes.
CEM VACUUM LUG CAPPER

She likes it better—

WHEN IT'S SEALED WITH A

CROWN VACUUM LUG CAP

Yes, housewives show a decided preference for products sealed with the Crown Vacuum Lug Cap. No other vacuum closure combines the same degree of protection and such convenience for the housewife.

With Crown Vacuum Lug Caps, no prying is needed in order to reach the contents. Just an easy quarter turn and the cap is off. It goes back on the same way time after time to make an effective re-seal.

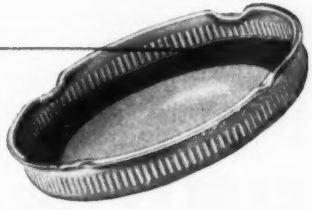
Here is a real sales builder for your vacuum packed products . . . an extra reason for Mrs. Housewife to select your particular brand. It offers new possibilities which you cannot afford to overlook. Naturally you will want more complete facts . . . and we are prepared to give them to you. Phone, wire or write us.

CROWN CORK & SEAL COMPANY

Closure Division • Baltimore 3, Maryland.

Patented SLIP RUBBER RING

Entirely different from other rubber compounds, this ring has a number of important advantages. It seals dependably. It makes caps easier to remove because it contains a special lubricant which prevents it from sticking to the glass. It is cut extra thick . . . seals off any slight irregularities in the sealing surface of the jar . . . will not cut through. In addition, Crown Slip Rubber Rings do not fall out in transit, during application, or when the cap is removed from the jar.



The Vacuum Seal with Sales Appeal

What's a Pedigree to do with Containers?

THE GOLDEN RETRIEVER inherits his canine intelligence and kindliness from sheep-herding forebears. The rich, golden, water-resisting coat, his steadiness and willingness to tackle difficult situations, makes the Golden Retriever a wonderful hunting companion admirably suited to severe cold and icy waters.

UNION BAG & PAPER CORPORATION
CERTIFICATE OF BOX MAKER
THIS BOX CONFORMS TO ALL CONSTRUCTION REQUIREMENTS OF CONSOLIDATED FREIGHT CLASSIFICATION
BURSTING TEST 175 LBS. PER SQ. INCH
SIZE LIMIT 60 INCHES
GROSS WT. LIMIT 40 LBS.
SAVANNAH, GA.

JUST THIS: Union corrugated boxes have a pedigree going back in an unbroken line to the forests owned or cultivated by Union . . . to Union's huge mills and fabricating plants.

That's why every Union box is uniform. That's why you can be sure every carload shipment will measure up to the same high standards as submitted samples or previous orders.

Minute Maid Corporation values Union's *pedigreed* boxes to be sure its famous Minute Maid frozen orange juice gets there *safely*. It is one of scores of America's leading manufacturers who pick the winner—the *pedigreed* Union Container.

Dependable Packaging Since 1872

UNION Corrugated Containers

UNION BAG & Paper Corporation

Principal Offices: WOOLWORTH BLDG., NEW YORK 7, N. Y.

Corrugated Container Plants: SAVANNAH, GEORGIA • CHICAGO, ILLINOIS • TRENTON, NEW JERSEY

THESE DRUMS PROVED BEST BY TEST

At Tobin Packing Co.
ALBANY DIVISION

The standards for drums at Tobin Packing Co. sound simple in print, but are hard to meet in practice.

The drums have to stand up under rough, daily plant handling—they have to be completely sanitary and unable to affect taste or flavor in any way—they have to be light enough to move around conveniently, and they have to be easy to clean.

This packer investigated. They tried Wear-Ever Aluminum Drums. Now, they're satisfied they've found the best. Wear-Ever drums are available in both 30 and 50 gal. sizes, and are available with slip-over cover, hinged cover and dolly.

Outstanding because:

CUT REPLACEMENT COSTS—Made of extra hard, extra thick aluminum alloy.

SANITARY—Smooth, seamless, rounded corners, continuous welds. Approved by Government Inspectors and local sanitary codes.

NON-RUSTING—Unaffected by moisture. Corrosion resistant.

EASY-TO-HANDLE—Light, in spite of the thick metal and hard alloy used.

ODORLESS—Will not absorb and pass along odors. Can impart no odor of its own.

COOLS PRODUCTS QUICKLY—Since aluminum is a good conductor of heat, an aluminum drum quickly carries off the heat of its contents when placed in cool air.

WEAR-EVER
Aluminum
Standard of Quality for more than 50 years

WEAR-EVER ALUMINUM TRADE MARK REG. U.S. PAT. OFF.

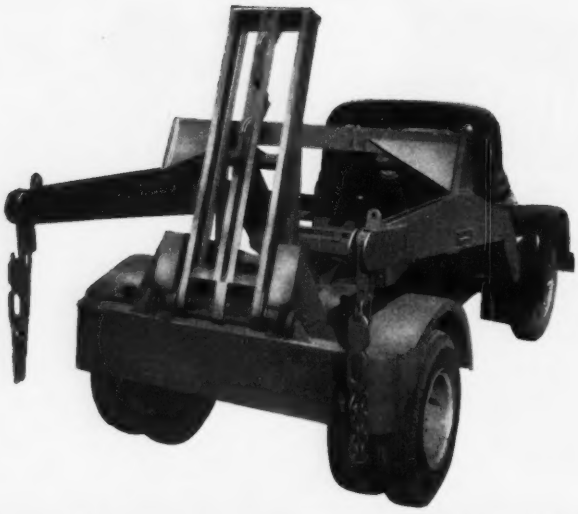
MAIL COUPON TODAY

The Aluminum Cooking Utensil Co.,
311 Wear-Ever Bldg., New Kensington, Pa.
Please supply us with complete details about your line of heavy-duty aluminum drums.

NAME .....

TITLE .....

Cut out, clip to your letterhead and mail today

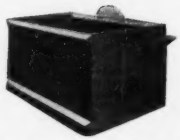


WHY USE 3 TO 5 TRUCKS... WHEN ONLY ONE WILL DO?

In many plants a Dempster-Dumpster, like the one above, operated by only one man, the driver, has replaced 3 to 5 conventional trucks and crews. The reason for this is that one truck-mounted Dempster-Dumpster serves scores of Dempster-Dumpster Detachable Containers up to four times the capacity of the average dump truck body. These containers are built in a wide variety of designs best suited to the type of materials handled—be they bulky, light or heavy . . . solids or liquids . . . trash or rubbish. Containers are conveniently located at accumulation points inside and outside buildings. To illustrate the flexibility of the Dempster-Dumpster System in handling all types of materials in your plant, we show, at right, a few of the dozens of Dempster-Dumpster Containers built to meet every bulk materials handling need. And remember, one truck-mounted Dempster-Dumpster handles all containers, regardless of capacity or design.

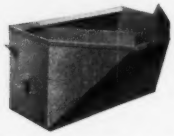
The Dempster-Dumpster System eliminates standing idle time of crews and trucks . . . eliminates re-handling of materials . . . increases efficiency, sanitation and good housekeeping . . . cuts cost of truck equipment and operation tremendously. Without question, it's the most efficient and lowest cost method of bulk materials handling by truck ever devised! The chances are this system will save you thousands of dollars annually. This equipment manufactured and sold exclusively by Dempster Brothers, Inc.

WHEN A CONTAINER IS FULL, the Dempster-Dumpster picks it up, hauls to destination and dumps the materials or sets load down intact. These three simple operations, shown above, are hydraulically controlled by driver in truck cab.

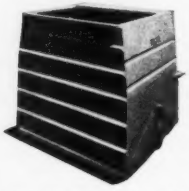


Drop Bottom Container built up to 10 cu. yd. capacity to handle heavy materials.

Tank Type Container meeting A.S.M.E. specifications. Capacities up to 1,200 gallons.



Tilt Type with Converged Lip for handling fine aggregate, wet or fluid materials.



Drop Bottom Pressed Steel Type for lighter service.

Universal Type built up to 12 cu. yd. capacity with top and end doors.

Five cu. yd. container with swivel casters for handling waste blast sand.

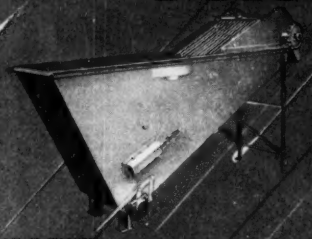
DEMPSTER BROTHERS, 7112 Shea Bldg., Knoxville 17, Tenn.

A CLEAN PACK EVERY TIME

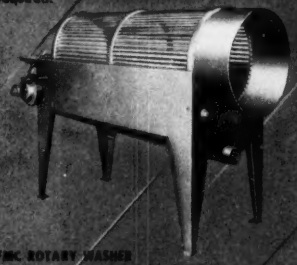
with fmc

SPECIALIZED WASHING EQUIPMENT

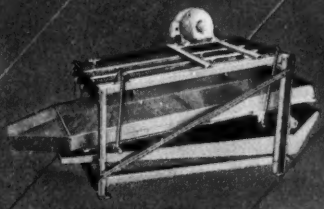
FMC washers are built to get fresh fruit and vegetables clean—quickly and economically. No delay, no halfway measures. This equipment is *performance proved* to make the most effective use of every drop of water. Each washer is designed for a specific service so that even the most difficult to wash product comes clean quickly for canning or freezing. Units for especially delicate products incorporate special "non-bruising" action in the washing process. Find out now how FMC washers can effect savings and maintain quality on your production line.



FMC MODEL IS WASHER
Tank and jet spray design for most effective washing of tomatoes, beets, turnips, potatoes and apples. Used where further rotary type washing is not required.

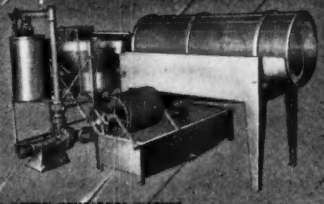


FMC ROTARY WASHER
Rolls and carries product clean under efficient spray nozzles, sweeping away dirt and foreign matter. Non-bruising action for tomatoes, beets, potatoes, carrots and fruit.



FMC SHAKER WASHER
For peas, whole kernel corn, green and dried beans, and small firm fruits. Rapid shaking motion spreads product over screen for thorough cleansing under water sprays.

FMC FLOOD TYPE WASHER
Gentle yet thorough washing of spinach and other leafy products through flooding and low-pressure spraying.

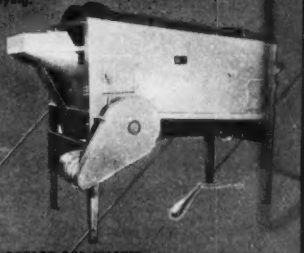


FMC (LEWIS) WHIRLPOOL WASHER
Designed primarily for efficient washing of cut corn through flotation and spraying. No mechanical moving devices to damage the kernels.

OTHER FMC WASHING EQUIPMENT

- Corrugated Cylinder Spray Washer
- W-Bottom Flood Type Washer
- Shaker Type Washer for Fruits
- Rotary Pea Washer
- Peerless Corn Washer
- Rotary Combination Washer

Other special washers also built for special requirements



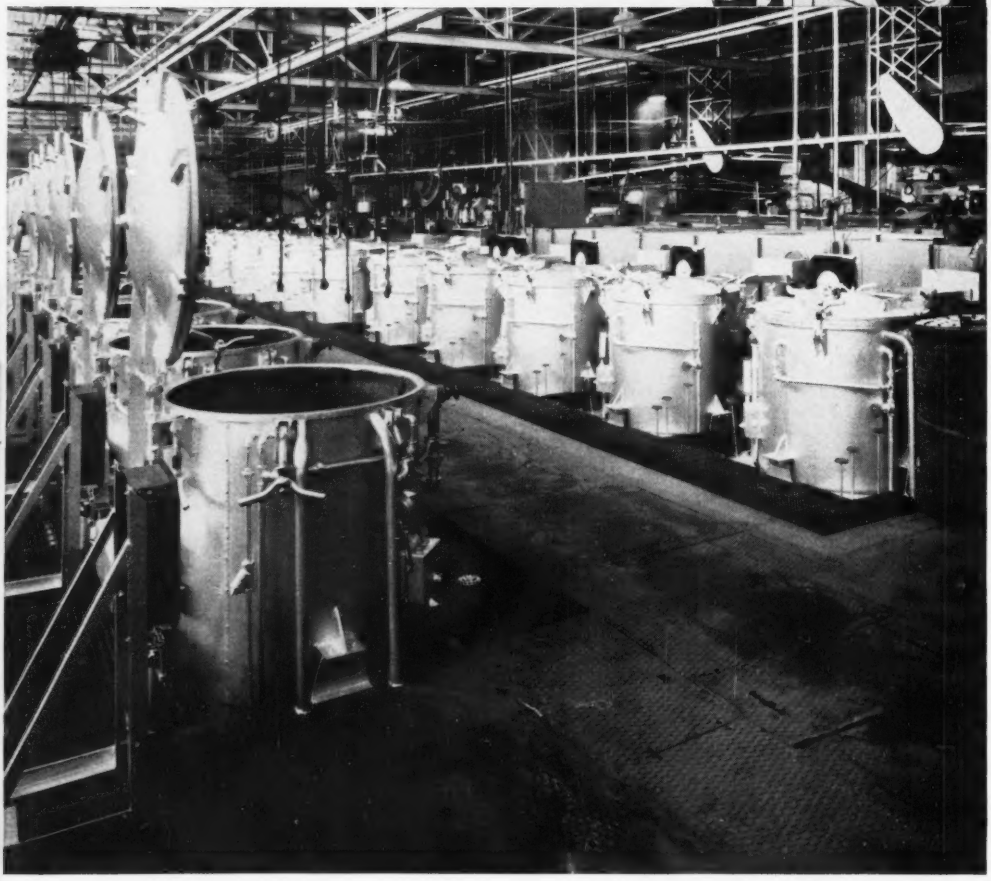
FMC ROTARY ROD WASHER
For hard root vegetables such as potatoes, carrots and turnips. Used extensively as a pre-washer prior to steam peeling.

First In Diversified Food Equipment

Trade Mark

FOOD MACHINERY AND CHEMICAL CORPORATION
Canning Machinery Division
General Sales Offices:
WESTERN: SAN JOSE 6, CALIFORNIA EASTERN: HOOPESTON, ILLINOIS

WHO HAS TO



Photograph above shows a bank of Taylor controlled retorts at the Francis H. Leggett & Company's plant in Landisville, N. J., where they process a large variety of fine food specialties. The Taylor W5T Control System supplies metered quantities of compressed air during the "come-up" period, processing and cooling portions of the cycle. With compressed air supplied continuously to a retort for circulation purposes such a system reduces to the practical minimum the total quantity of air used during the entire process. Expenditure for air compressor capacity is also substantially reduced as air is used at the higher rate for a relatively small portion of the cycle. Cooking period is automatically timed. At the end of the cook a light is extinguished to signal operator that it is time to admit the cooling water. During the entire cycle, the pressure inside the retort is maintained in positive relation to the pressure inside the containers.

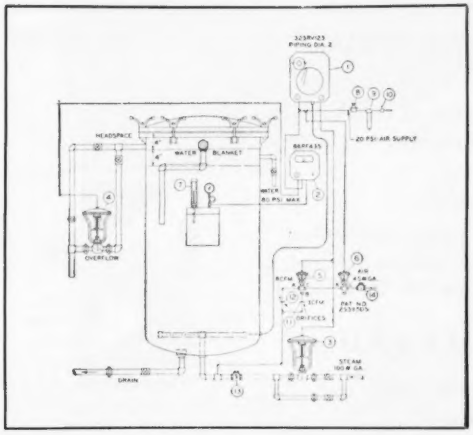
TIME THE COOK?

"Nobody," says Leggett, "when you have this new Taylor W5T Retort Control!"

AT the Landisville, N. J., plant of the Francis H. Leggett & Company their retorts are controlled by the Taylor W5T system, so they should know. This system is designed to "cook" within the narrow limits required for glass packaging as well as for processing tin containers, such as the can of "Sauce Arturo" shown here.

In addition to timing the process period the W5T Retort Control System automatically controls water temperature at the startup, controls pressure throughout the entire cycle, controls the processing temperature and shuts off steam at the end of the processing period.

There's a Taylor Control System to cut costs and improve product quality for most any processing system. Ask your Taylor Field Engineer how we can help you, or write for **Catalog 500.** Taylor Instrument Companies, Rochester, New York, and Toronto, Canada.



Instruments for indicating, recording and controlling temperature, pressure, flow, liquid level, speed, density, load and humidity.

Taylor Instruments
MEAN
ACCURACY FIRST
IN HOME AND INDUSTRY

For more information, use post card on last page.

THERE IS PLENTY OF TIN IN MALAYA

Only a deliberate distortion of facts could give rise to the false impression that tin is in short supply.

You should know the truth.

We have prepared a 20-page booklet that graphically and concisely presents the complete story. A copy is yours for the asking.

THE MALAYAN TIN BUREAU

Department 26

1028 Connecticut Avenue Washington 6, D. C.

There Is Plenty of Tin in Malaya

MALAYAN TIN BUREAU

INDUSTRY'S ALL-TIME FAVORITE FOR LONG RANGE *Economy*

JENKINS
Fig. 106-A
Renewable Composition Disc

BRONZE GLOBE VALVE

150 lbs. Steam
200 lbs. O.W.G.

Take a Jenkins Fig. 106-A apart. It's easy to see why it is industry's all-time favorite. Note the liberal dimensions of body and bonnet casting — the heavy, manganese bronze spindle, with more strong threads in contact with the bonnet, regardless of spindle position. See how the slip-on, stay-on disc holder fully protects the edge of the disc, prevents creeping, flaking, or cracking.

Every part, from perfect grip, heatproof handwheel to pipe ends, reflects the designing skill of Jenkins valve *specialists.* There's a good reason. Jenkins Bros. introduced the *first* renewable composition disc valve, — is today the only manufacturer of both valves *and* discs.

Fig. 106-A not only looks better — it proves out better in performance. In any comparison, its long life, low upkeep record has never been surpassed. That is the true measure of valve cost — and it is the reason why industry's shrewdest buyers will settle for nothing less than Fig. 106-A quality.

JENKINS VALVES

LOOK FOR THE DIAMOND MARK

SINCE 1864 — TRADE JENKINS MARK

Jenkins Bros.

GET THIS FOLDER — Gives details of Fig. 106-A design, and "family" interchangeability. Ask your Jenkins Distributor for Form 189-A, or write Jenkins Bros., 100 Park Ave., New York 17.

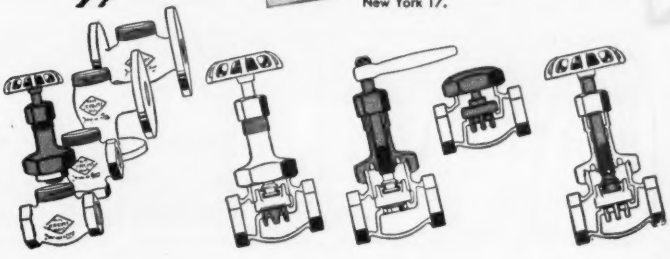


Fig. 106-A "Family" interchangeability meets 90% of your valve needs with a small inventory of parts. Start with the standard Fig. 106-A. Trimming is interchangeable in Globe or Angle body, screwed or flanged. With a few parts, quickly-assembled combinations provide a Lift Check, a Spring-loaded Check, and valves for Stop and Check, Quick-opening, or Throttling service.

how to keep

out of a

If your jelly has been getting into a jam because of short shelf life, it's time to start using Monsanto Sodium Benzoate as your preservative. You can depend on sodium benzoate to preserve jelly, jam, preserves, margarine and scores of other foods. As little as one-tenth of one per cent is all that is needed.

Monsanto Sodium Benzoate is one of the purest chemicals produced in commercial quantities. Like other Monsanto Chemicals for foods, sodium benzoate is produced under strict laboratory control.

You can get Monsanto Sodium Benzoate in flake or powder form. They are equal in quality but many users prefer flakes because they do not ball or cake and are practically free from dust.

For your free copy of the 16-page Monsanto booklet, "*Benzoic Acid and the Benzoates*," contact the nearest Monsanto Sales Office or write MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1700 South Second Street, St. Louis 4, Mo.

DISTRICT SALES OFFICES: Birmingham, Boston, Charlotte, Chicago, Cincinnati, Cleveland, Detroit, Houston, Los Angeles, New York, Philadelphia, Portland, Ore., San Francisco, Seattle, Twin Cities. In Canada, Monsanto Canada Limited, Montreal.

SODIUM BENZOATE

MONSANTO
CHEMICALS — PLASTICS

SERVING INDUSTRY . . . WHICH SERVES MANKIND

These Plain, Hard Facts Prove It...

You save from start to finish with

CHEVROLET ADVANCE-DESIGN TRUCKS

Fact No. 1

THEY LIST FOR LESS

Chevrolet trucks *list for less* than any truck with comparable specifications that can handle an equal payload. Yet your money buys a combination of great truck features that you'll find only with Chevrolet. And that means value unmatched by any other truck in its field.

Fact No. 2

OPERATING COSTS SAVE YOU MONEY

Chevrolet's time-proved Thriftmaster and Loadmaster Valve-in-Head engines are famed for fuel, oil and upkeep economies. Extra-rugged frame, hypoid rear axle, Flexi-Mounted cab, and other features keep the truck rolling for many thousands of low-cost miles.

Fact No. 3

A MODEL THAT'S RIGHT FOR YOUR JOB

With Chevrolet's wide range of models, there's never the problem of "too little" or "too much" truck for the job. Each truck is factory-matched to its job. Standard body on standard chassis, or standard chassis for a special body, there's a Chevrolet truck to cut your costs.

Fact No. 4

YOUR INVESTMENT EARNS A HIGHER RETURN

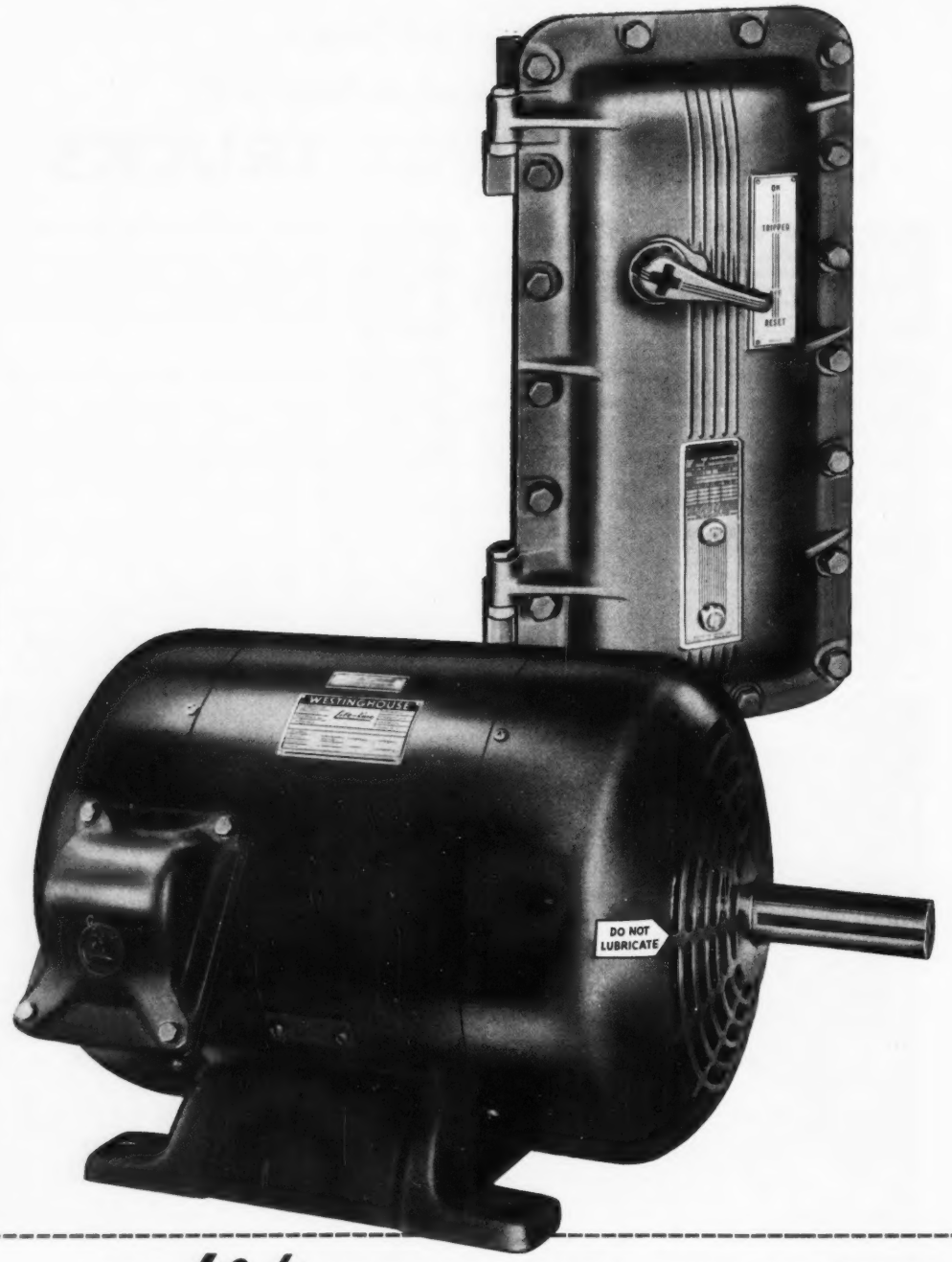
Big demand for Chevrolet trucks means a traditionally higher price when you trade your Chevrolet for a new one. You save money all the way with a Chevrolet—from the day you buy it until the day you trade it. See your Chevrolet dealer now—and save!

CHEVROLET ADVANCE-DESIGN TRUCK FEATURES

TWO GREAT VALVE-IN-HEAD ENGINES—Loadmaster or the Thriftmaster—to give you greater power per gallon, lower cost per load • POWER-JET CARBURETOR—for smooth, quick acceleration response • DIAPHRAGM SPRING CLUTCH—for easy-action engagement • SYNCHRO-MESH TRANSMISSION—for fast, smooth shifting • HYPOID REAR AXLE—for dependability and long life • TORQUE-ACTION BRAKES—on light-duty models • PROVED DEPENDABLE DOUBLE-ARTICULATED BRAKES—on medium-duty models • TWIN-ACTION REAR BRAKES—on heavy-duty models • DUAL-SHOE PARKING BRAKE—for greater holding ability on heavy-duty models • CAB SEAT—with double-deck springs for complete riding comfort • VENTI-PANES—for improved cab ventilation • WIDE-BASE WHEELS—for increased tire mileage • BALL-TYPE STEERING—for easier handling • UNIT-DESIGNED BODIES—for greater load protection • ADVANCE-DESIGN STYLING—for increased comfort and modern appearance.

CHEVROLET DIVISION OF GENERAL MOTORS, DETROIT 2, MICHIGAN

CHEVROLET first in demand in value in sales



WHAT *Life-Lines* REALLY DELIVER IS MORE SERVICE...LESS SERVICING

The time to stop explosions is before they start

And here's the equipment to do it

Dual Label Explosion-Proof Motor

In any location where Class II, Group G, or Class I, Group D explosive materials present a hazard, you can operate this Life-Line explosion-proof motor safely. It's underwriter approved for *both* explosive dusts and explosive vapors.

And the Life-Line offers extra protection against outages. Heavy steel construction provides greatest protection against physical damage. Pre-lubricated bearings need no further lubrication . . . eliminate outages due to faulty greasing. Superior winding techniques and insulation reduce electrical failures. Together they add up to longer life . . . less servicing.

For Hazardous Locations—Life-Linestarters®

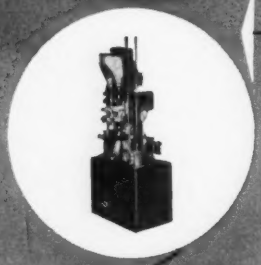
Specially reinforced, cast enclosures with wide flame seals are available in Class I, Group D. Class II, Groups E, F, G are also available. Bi-metal overload relay protection and AB Circuit Breakers cut down time. In case of fault, no need to remove cover to reset breaker or overload relay mechanism. Service is restored immediately.

Simple design, single operation mean fewer operating parts to foul. Seesaw action of clapper prevents accidental operation. Kickout spring assures positive opening. Exclusive "De-ion®" arc quenching plus silver-to-silver contacts eliminates contact filing. Compare any other starter and see why Life-Lines offer more service with less servicing.

Together Life-Line motors and starters offer the food industry a new concept in performance. You get more service on the job . . . less down time and servicing. Ask your Westinghouse representative for complete details on both, or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-21701

YOU CAN BE SURE...IF IT'S
Westinghouse

Life-Line
MOTORS and CONTROLS

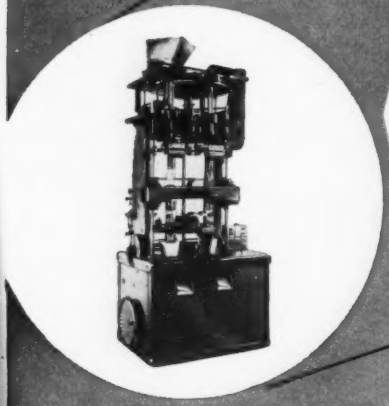


MODEL "A"

For smaller quantities at high production rates.

PRODUCTS:	Liquids, tablets, granuals, powders.
FEEDS:	Volumetric, Auger, Liquid.
MATERIALS:	Cellophane, Polyethylene, Glassine, Coated Kraft, Pliofilm and others.
SIZES:	1¼" x 1½" to 2¾" x 6½".
STYLE PKG:	Fin Seal or Pillow.
PRODUCTION:	Average — to 150/min.
EXTRAS:	Gas fill, counter, dating, photo-registry, Strip Seal for lamination.

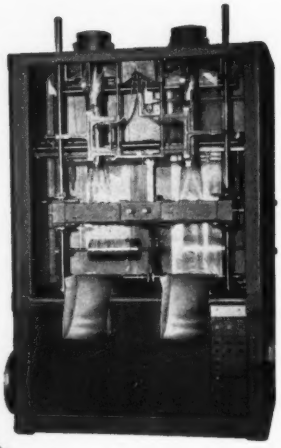
TRANSWRAPS — INCREASE YOUR PROFITS * with "One-Step"



MODEL "B"

Work horse of Flexible Packaging — for most jobs.

PRODUCTS:	Candies, nuts, syrups, sugar, rice, pills, crackers, tidbits, marbles and like products.
FEEDS:	Volumetric, Auger, Liquid, Net Weight.
MATERIALS:	Foil, Cellophane, Polyethylene, Pliofilm, Vinyl, Saran, Laminations, Kraft and others.
SIZES:	2½" square to 5" x 6".
STYLE PKG:	Fin Seal or Pillow.
PRODUCTION:	Average — to 100/min. Double — to 240/min.
EXTRAS:	Gas fill, counter, photo-registry, Strip Seal for pillow with laminations, printing attachment.



MODEL "C"

Hydraulically operated — for larger size packages.

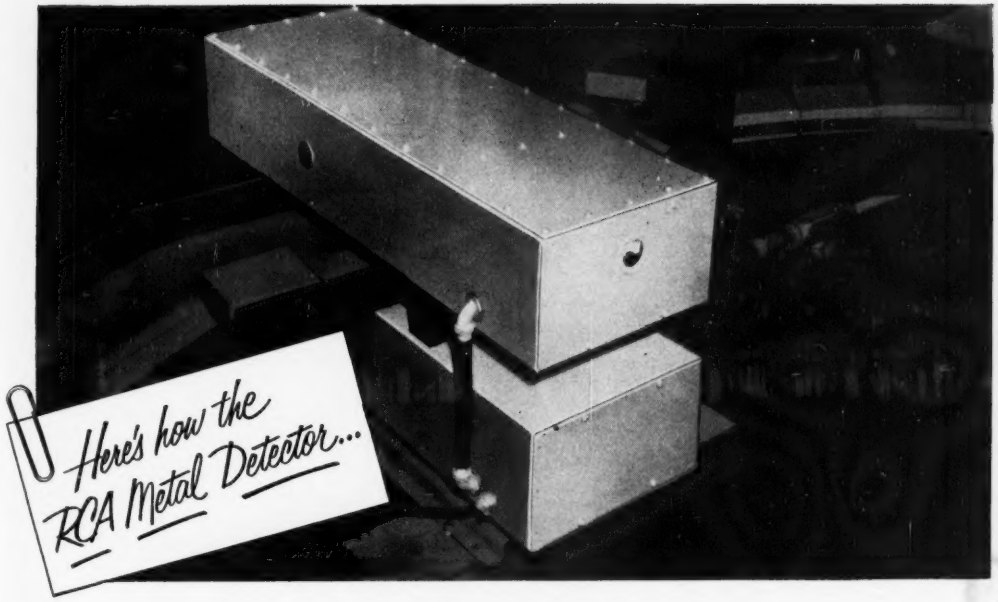
PRODUCTS:	Dried fruits, nuts, candies, chips, crackers, minced products, powders and many others.
FEEDS:	Volumetric, Auger, Liquid, Net Weight.
MATERIALS:	Foil, Cellophane, Polyethylene, Pliofilm, Saran, Kraft and other heat-sealers.
SIZES:	Up to 9½" x 13½".
STYLE PKG:	Fin Seal or Pillow.
PRODUCTION:	Up to 60/min.
EXTRAS:	Gas fill, counter, photo-registry, Strip Seal attachment, printing attachment.

* Forming, filling, sealing in one operation . . . from rolled stock.

Saves material costs
Reduces labor costs
Increases production

TRANSPARENT WRAP MACHINE CORPORATION

ROUTE 17 & HENRY STREET • HASBROUCK HEIGHTS, NEW JERSEY



Searches your product for stray metal

Throughout the nation, in large and small plants, the RCA Metal Detector is at work searching through raw ingredients and packaged goods—protecting important product names from complaints of stray metal.

Through the use of radio waves, the RCA Metal Detector searches "clear through" your product. It can be regulated to find pieces of metal as small as 0.039 inches in diameter. It can find the important offenders such as cotter pins, hairpins, burrs from machinery, *no matter how deeply imbedded.* It spots any kind of metal—magnetic or non-magnetic—at conveyor speeds as high as 1000 feet per minute.

The compact RCA Metal Detector fits easily into any conveyor system . . . belt, chute, duct, vibrator, inclined plane, automatic hopper . . . provides inspection with practically no installation problems. In most cases it goes in without any shut-down of conveyor lines. Complete maintenance is available from nation-wide RCA Service Co.

Your RCA Metal Detector can be arranged (1) to reject contaminated packages from your conveyor, (2) to sound a signal for manual rejection or (3) to stop conveyor lines when it spots the presence of tramp metal.

RCA Metal Detectors are at work now, protecting the products of the nation's leading food and candy manufacturers.

DON'T DELAY—MAIL COUPON NOW

RCA

INDUSTRIAL EQUIPMENT

RADIO CORPORATION of AMERICA

ENGINEERING PRODUCTS DEPARTMENT, CAMDEN, N.J.

In Canada: RCA VICTOR Company Limited, Montreal

Radio Corporation of America
Dept. 198K, Building 15-7
Camden, N. J.

Please send me information on the RCA Metal Detector.

Name_____

Title_____

Company_____

Address_____

City_____ Zone_____ State_____

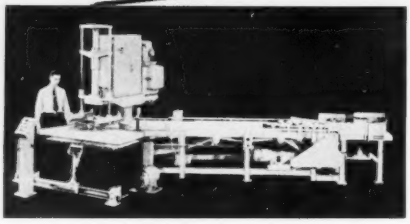
☐ Please have a sales engineer call on me.

When looking for lower cost in Food Packing...

CHECK WITH BARNES

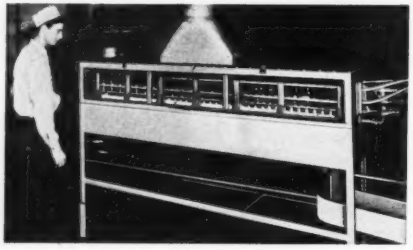
The products and installations we have made for the food industry are many and varied. However, each has one important feature in common . . . it has helped a food packer do a better job at less cost. These products and installations have resulted from our work in collaboration with food packers on specific problems. If you have similar or other problems in your plant it will pay you to talk to a Barnes' process engineer. There is no obligation for this service.

Over 500 Cans Unloaded per Minute

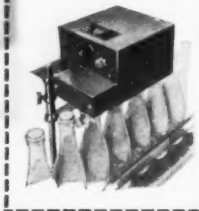


This unloader accommodates both rectangular and round cans. It is provided with a special rotary can unscrambler and a long conveyor to accommodate hand casing of cans containing whole hams. It unloads up to 600 cans per minute depending upon size and shape of cans.

Production Jar Washer



This is one of our newest items for the glass packer. Jars, prior to entering the washer, are inverted and enter the washer with open end down. A fine spray of hot water under high pressure is applied to both inside and outside of jars as they pass through the enclosed washer.



Electronic Detector

This efficient unit detects missing closures. It has full automatic operation, is single, fast and dependable. It has a wide range of application, prevents loss of product and minimizes line down time.

Other BARNES Processing Equipment

Automatic Retort Basket Loaders and Unloaders
Packaged Can Unloaders
Glass Handling Machines
Special Conveyors
Tray Loader
Pallet Unloader
Carton Uncaser
Double Seamer

FREE ADDITIONAL DATA on these and other time and money savers for the food packer will be sent upon request. Write today. Ask for bulletin E1152

W. F. and JOHN BARNES

PROCESS EQUIPMENT DIVISION 310 SOUTH WATER STREET, ROCKFORD, ILLINOIS

(ADVERTISEMENT)

City Health Department Investigates Martin Aseptic Canning of Fresh Whole Milk

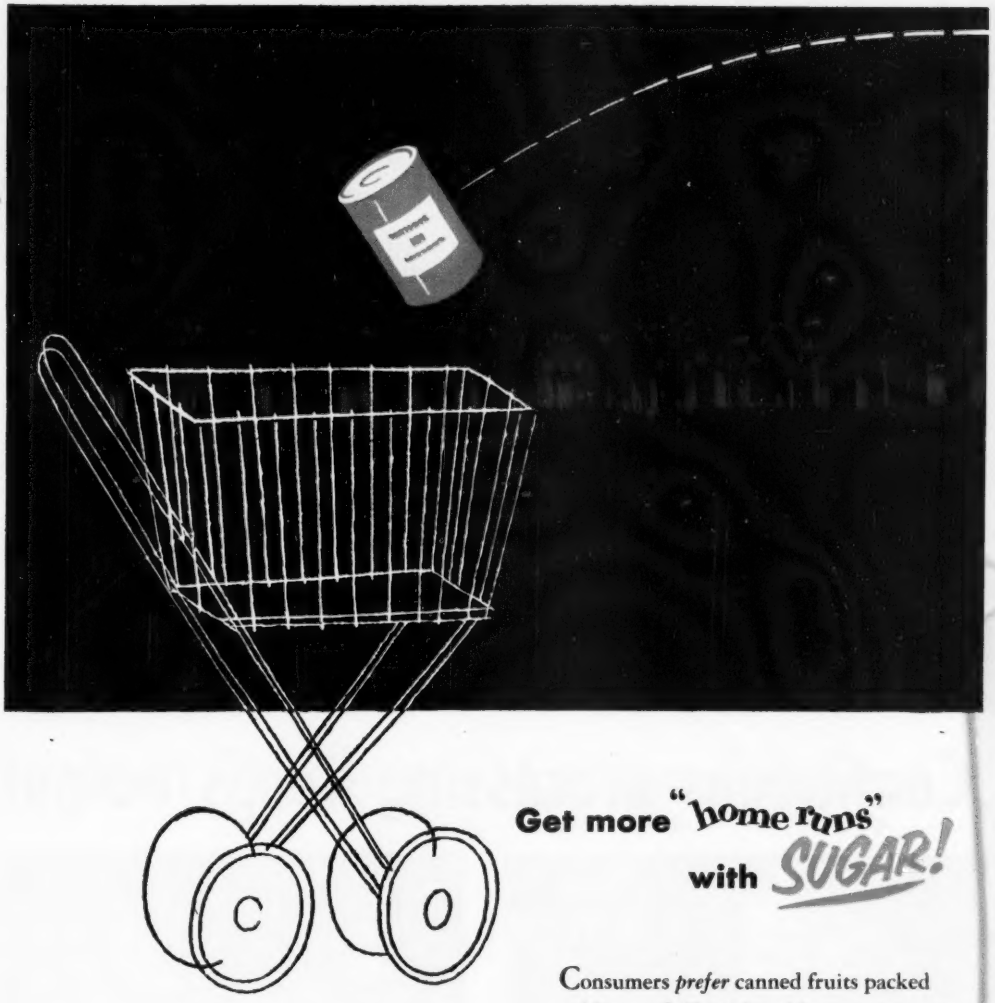
The population of Rockford, Illinois is approximately 100,000. The daily consumption of whole milk approximates 57,000 quarts. Recently, the Rockford City health department made a local sanitary field study of the Martin Method of Aseptically canning milk and milk products. This was done in anticipation of the possibility of one or more Martin Aseptic canning units being installed in the Rockford Metropolitan area.

Find Finished Product of "Good Flavor, Color, Texture, and Good-Keeping Quality"

Among the many features found in the summary of the Rockford Health Department Report are those of commercial value as we have stressed in this column previously. From a public health standpoint they report: "Clinical laboratory test results apparently reveal that the Martin Method of Aseptically canning sterilized milk and milk products in sealed containers can meet acceptable public health standards of sanitation."

Only Two Units Required to Serve City of 100,000

Only two Martin Aseptic canning units would be necessary to handle the daily demand for fresh milk in Rockford. For further information on this interesting system write to W. F. and John Barnes Co., Process Equipment Division, 301 South Water Street, Rockford, Illinois.



Get more "home runs" with SUGAR!

Consumers *prefer* canned fruits packed with sugar*. Knowing this, most canners use sugar—and *only* sugar—in their packs.

Sugar is economical. It provides 25 to 50% more sweetening power.

Sugar is easier to use—it needs no special handling or storage.

Use sugar—its complete dependability makes better quality a certainty—better sales a probability.

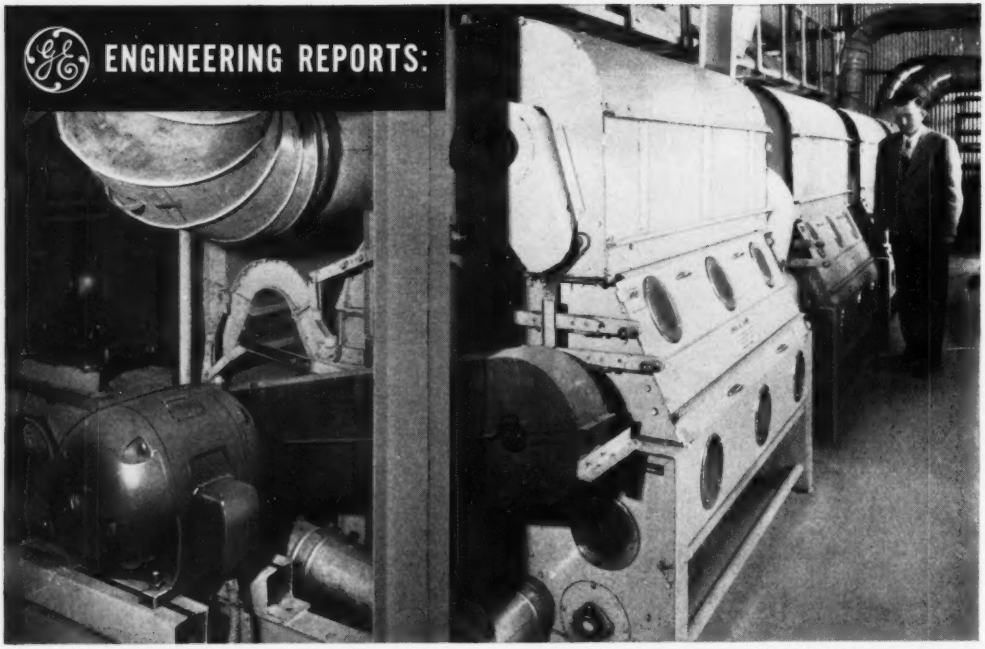
For up-to-the-minute facts explaining why sugar is the safest, most effective, and in the long run, most economical sweetening agent you can use, write Dept. W.

Sucrose: Cane and beet sugar

SUGAR
INFORMATION INC.
NEW YORK 5, NEW YORK

For more information, use post card on last page.

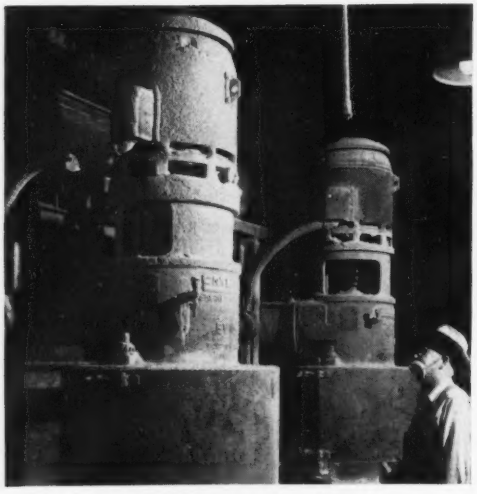
ENGINEERING REPORTS:



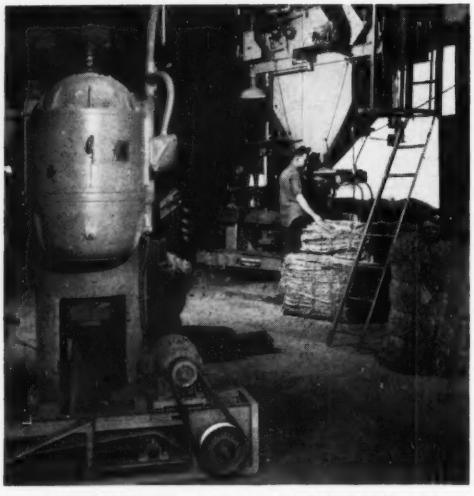
1 **DRIVING THE LINT CLEANER** on this Murray Gin is a standard 15-hp G-E Tri-Clad* motor. Enclosures for motors throughout the plant were carefully selected to meet specific atmosphere prevailing in each area. The gin is one of five, each of which can produce about 450 tons of seed per day when in full production.

*Registered trade-mark of General Electric Co.

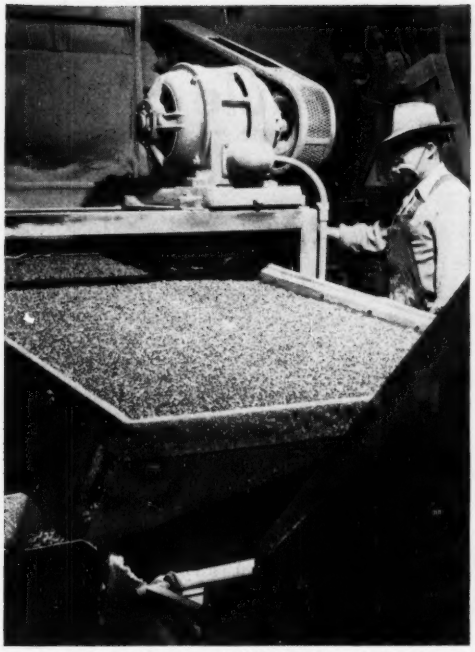
Continuous processing keeps output



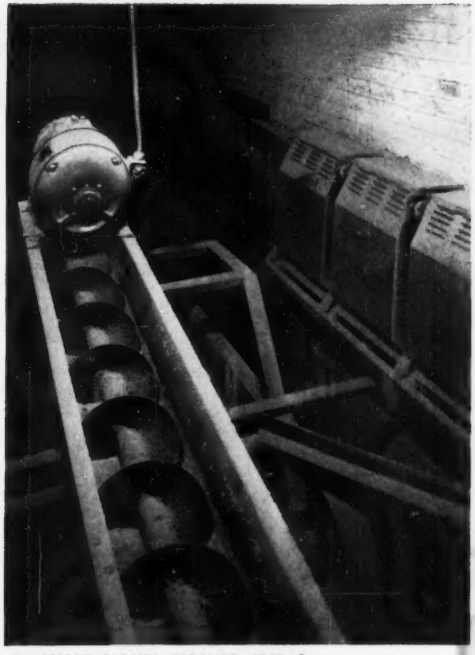
4 **"FOR 24 HOURS A DAY,** these G-E 40-hp vertical motors take heavy loads and never give a bit of trouble," says Tom Degnan, in charge of separator room.



5 **PELLET MACHINE,** driven by 50-hp G-E totally enclosed fan-cooled motor, produces cattle-feed pellets from ground seed. Pellets are sacked by machine at right.

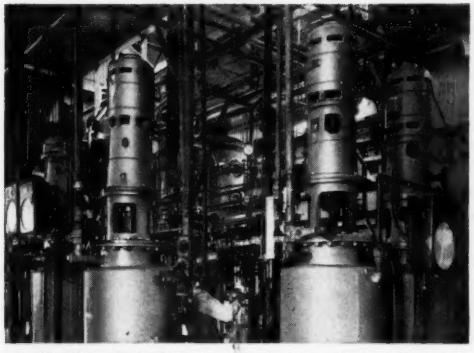


2 **SEPARATOR FREES CRACKED SEED** from hulls. The 15-hp G-E motor shown is standard screenless open textile motor which prevents clogging from lint by means of free flow of air through motor.



3 **AUGER MOVES CLEANED SEED** from separator room. Auger is driven by a 5-hp G-E gear-motor. Three G-E 15-kva, 60-cycle transformers are for lighting circuits in this plant area.

high at Producers' Cotton Oil Co.



6 **IN THE REFINERY,** six re-hydration mixers blend soda ash with cottonseed oil to remove impurities and soap stock. Mixers are driven by 15-hp vertical G-E motors.

76 tons of oil, 191 tons of meal produced per day with help of G-E drive systems

To turn out an average seasonal yield of 21,760 tons of oil and 54,400 tons of meal, Producers' Cotton Oil Company, Fresno, Cal., keep their processing line working 24 hours a day, every day of the season.

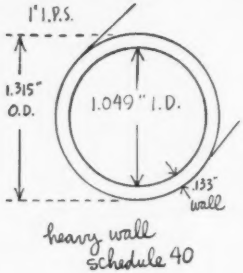
One important reason why the plant can produce at such a pace, without let-up, is this: careful planning went into the electrical system. General Electric application engineers—specialists in electrification of food processing—worked with plant engineers and machinery manufacturers to select standard apparatus to fit the specific production and atmospheric requirements of this plant.

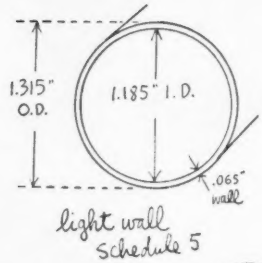
If *you* plan to install a new processing line, or modernize an old one, G-E application engineers can help you. Your nearest G-E Apparatus Sales Office will tell you more. General Electric Company, Schenectady 5, N. Y. 652-12

Engineered Electrical Systems for Food Plants

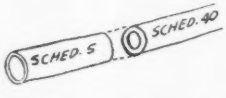
GENERAL ELECTRIC

here's what you gain with stainless schedule 5 pipe





You save money. Schedule 5 pipe costs about half as much per foot as Schedule 40.



Schedule 5 has the same O.D. as Schedules 10, 40 and 80 —for hook-up with existing lines as well as for new installations.

Its larger I.D. increases flow and capacity in pipelines, exchangers and other equipment.

It's lighter. This means quicker and easier installation.

You can save substantially on valves, fittings, weld rods, etc., because smaller O.D. material can frequently be used. Tubing sizes can now be replaced with light wall pipe . . . for ready hook-up with standard valves, pumps, and other equipment normally manufactured in pipe sizes.

Fittings as well as stocks of Schedule 5 pipe are carried by conveniently located Carpenter distributors.

Specify Schedule 5 pipe . . . it saves dollars . . . and makes a lot of sense!

THE CARPENTER STEEL COMPANY
Alloy Tube Division, Union, N. J.
Export Dept : The Carpenter Steel Co., Port Washington, N.Y. "CARSTEELCO"

Data Sheets give you complete information about Carpenter Schedule 5 Stainless Pipe. Write for your personal copy.

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more than corrosion resistance

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STAINLESS TUBING & PIPE

- guaranteed on every shipment

Good Taste

MAKES SALES SOAR

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SEASONINGS

Flavors America's Finest Food Products

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Gives Good Protection, too!

Fine foods deserve the *best* flavor-protection that packaging can provide. That is why so many packers of moist foods use so much West Carrollton Genuine Vegetable Parchment, year after year—thereby winning quicker and more lasting public acceptance. This parchment is ODORLESS, TASTELESS, GREASE-RESISTANT, INSOLUBLE and is STRONG, too, wet or dry. We can print it for you in one or more attractive colors (special inks)—right to your specifications.

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BUTTER TUB LINERS & CIRCLES
BUTTER BOX LINERS

LARD CARTON LINERS
MILK & ICE CREAM CAN TOPS
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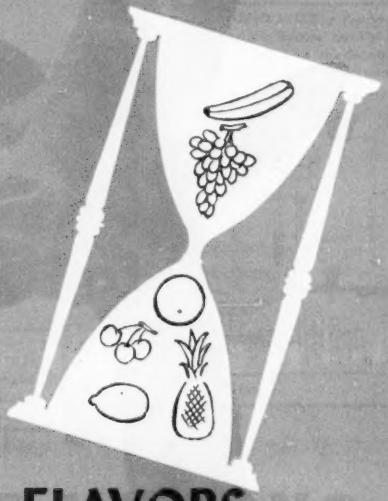

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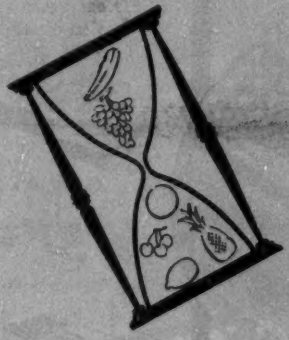
Droplets of fresh, pure, flavor, completely sealed from the atmosphere with an edible protective film . . . SEALVA powdered flavors are not subject to the usual spoiling and oxidation occurring in other flavors when exposed to extended shelf-life. SEALVA flavors have a wide application in all branches of the food industry where lasting strength and quality are desirable. SEALVA flavors are presently available in strawberry, raspberry, cherry, orange, lemon, lime and peppermint. Samples will be forwarded at your request.



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Empire Box keeps your costs under control, too, by utilizing up-to-date, more efficient production techniques. And Empire's multi-plant operation helps you save on shipping costs — an important money-saving factor.

Call or write Empire Box when next you buy folding cartons. You can always depend on Empire Box to deliver fine quality folding cartons at prices you can afford to pay.

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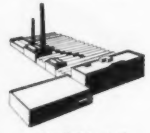
3 GREAT PLANTS TO SERVE YOU

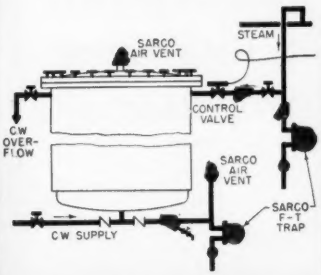


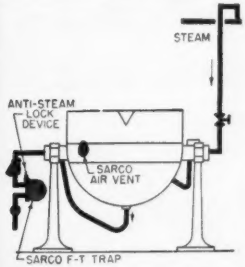
Garfield, N. J.

Stroudsburg, Pa.

South Bend, Ind.

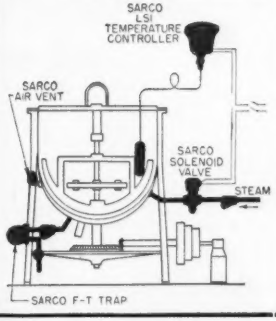
1 CANNING RETORT – down flow steam improves air venting. Draining and air venting automatically with Sarco equipment.



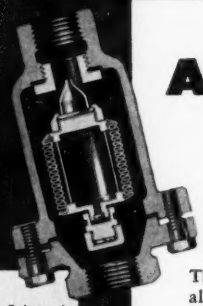


QUICK BOILING TILTING KETTLE – rapid air venting and draining with Sarco controls. **2**

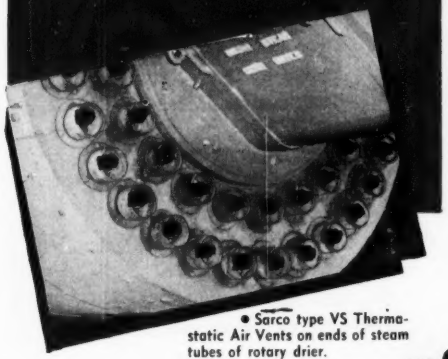
3 JACKETED MIXER – the Sarco Automatic System quickly removes air and condensate, holds the temperature constant.



quick AIR VENTING increases efficiency of process equipment



• Sarco Balanced Pressure Thermostatic Air Vent, type VS, sizes ⅜" to 1¼", pressures to 225 psi. Very large capacities.



• Sarco type VS Thermastatic Air Vents on ends of steam tubes of rotary drier.

● AIR in steam spaces cannot supply useful heat. The temperature of a mixture of air and steam is always lower than that of pure steam at the same pressure. So air in steam has the same effect as reducing the operating steam pressure.

Air and non-condensable gases in the steam space form an objectionable insulating film on the condensing surfaces. Such a film, only 1/1000" thick, can reduce the heat transfer rate by as much as 11%.

Quick and complete removal of air from steam heated equipment not only shortens warming-up time, it also improves surface temperatures, thus increasing production and reducing fuel consumption at the same time.

Sarco Thermostatic Air Vents...

are expressly designed to rid all types of process equipment of air and non-condensables and keep them that way.

When starting up, the large discharge valve is wide open, providing rapid and complete discharge of initial air. Air which collects during operation is discharged promptly, regardless of steam pressure or temperature.

For full information on where and how to apply air vents to speed production and save fuel, write for Bulletin 275-4.

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REPRESENTED IN PRINCIPAL CITIES
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SARCO
improves product quality and output

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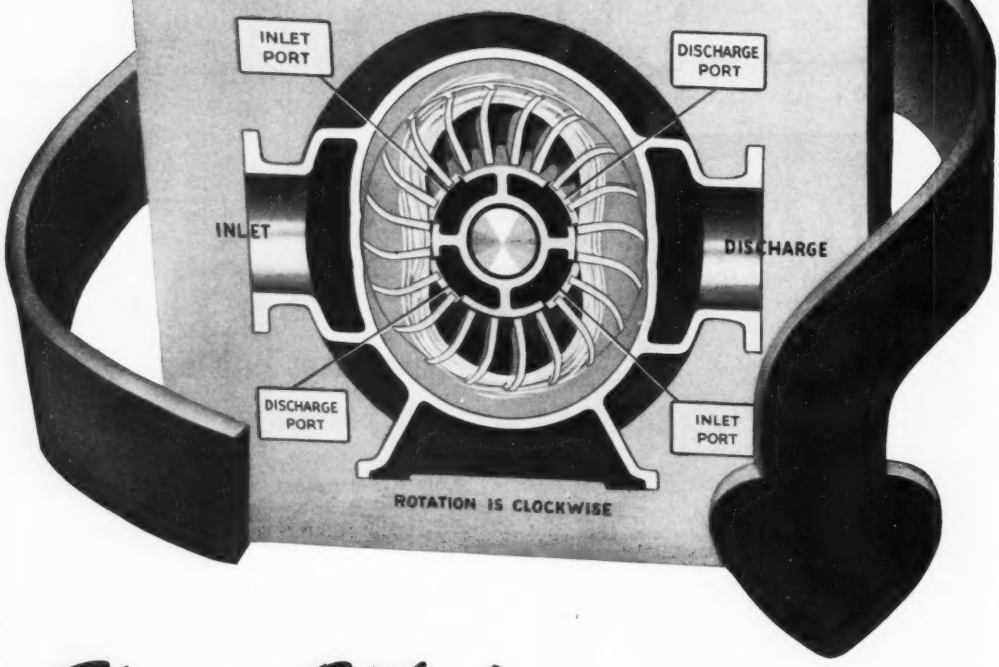
Nash Instrument Air Compressors deliver only clean air, free from oil or dust, and without filters



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You can dispense with oil filters and dust filters when you install ®Nash® Clean Air Compressors. You can save the cost of maintaining these devices. You can greatly reduce instrument maintenance costs. For the Nash employs no internal lubrication, therefore no troublesome oil is in the delivered air. Moreover, air from a Nash is thoroughly washed and cooled as it passes thru the pump. Dust in the plant atmosphere, even fly ash, is immediately removed.

®Nash® Clean Air Compressors are simple, with only one moving element. No valves, gears, pistons, sliding vanes, or other enemies of long life and constant performance complicate a Nash. No aftercoolers are needed. You will find it profitable to investigate these pumps, now.

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No dust filters.
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Non-pulsating pressure.
Original performance constant over a long pump life.
Low maintenance cost.

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B&W STAINLESS TUBING DATA

Mr. Tubes—your nearby B&W Tube Representative—will be happy to provide additional information and to discuss any specific tubing problem with you.

Engineering data on stainless steel tubing . . . prepared by engineers for engineers . . . pours out of Babcock & Wilcox headquarters in an endless stream of technical literature and other communications, to keep designers, stainless fabricators and process engineers well-informed about latest stainless tubing developments and applications, and to provide an interchange of field experience among stainless tube users.

Important findings of metallurgists and application engineers, of chemists and other specialists concerned with corrosion resistance, fabrication and special tubing needs are condensed and published in ready-reference form as fast as data can be reviewed and verified.

B&W offers a most comprehensive file of information on stainless tubing, both seamless and welded. The technical help this literature offers is exceeded only by the personal assistance on specific tubing problems you may expect from B&W field representatives.

If you want stainless tubing facts where you can find them—tips to help you speedily solve tubing problems and to suggest ideas for greater stainless tubing service satisfaction—send for B&W bulletins you may select from this partial list of current data.

YOURS FOR THE ASKING

- ☐ TB-1 Properties and Methods of Working Seamless and Welded Tubes and Pipe of the B&W Stainless Croloys
- ☐ TB-11 Specifications for Seamless and Welded Tubular Products—Stainless, Alloy and Carbon Steels
- ☐ TB-15 Weight Tables, Round Seamless and Welded Steel Tubing
- ☐ TB-19 B&W Stainless Croloy Tubing Steels—Seamless and Welded, Condensed Technical Data
- ☐ TB-332 B&W Stainless Pipe, Seamless or Welded
- ☐ TB-335 Descriptive Terms, Steel Tubing, B&W Seamless and Welded Tubes
- ☐ TDC-130 B&W Stainless Pipe and Tubing—Croloy 18-8S (Type 304)
- ☐ TDC-132 B&W Stainless Pipe and Tubing—Croloy 18-8Cb (Type 347)
- ☐ TDC-133 B&W Stainless Pipe and Tubing—Croloy 16-13-3 (Type 316)
- ☐ TDC-134 B&W Stainless Pipe and Tubing—Croloy 25-20 (Type 310)
- ☐ TDC-138 B&W Pipe, Seamless and Welded—Carbon, Alloy and Stainless Steels—Dimensions, Weights, Specifications, Grades, Analyses
- ☐ TDC-140 B&W Stainless Pipe and Tubing, Croloy 12 Al (Type 405), Croloy 18 (Type 430), Croloy 27 (Type 446)
- ☐ TDC-143 B&W Stainless Tubing, Croloy 12 (Type 410) 12-2 (Type 414)
- ☐ TDC-148 Condensed Data on Working Seamless or Welded Tubing and Pipe—B&W Croloy Stainless Steels
- ☐ TA-1517 B&W Stainless Steel Tubing for the Food Processing Industry

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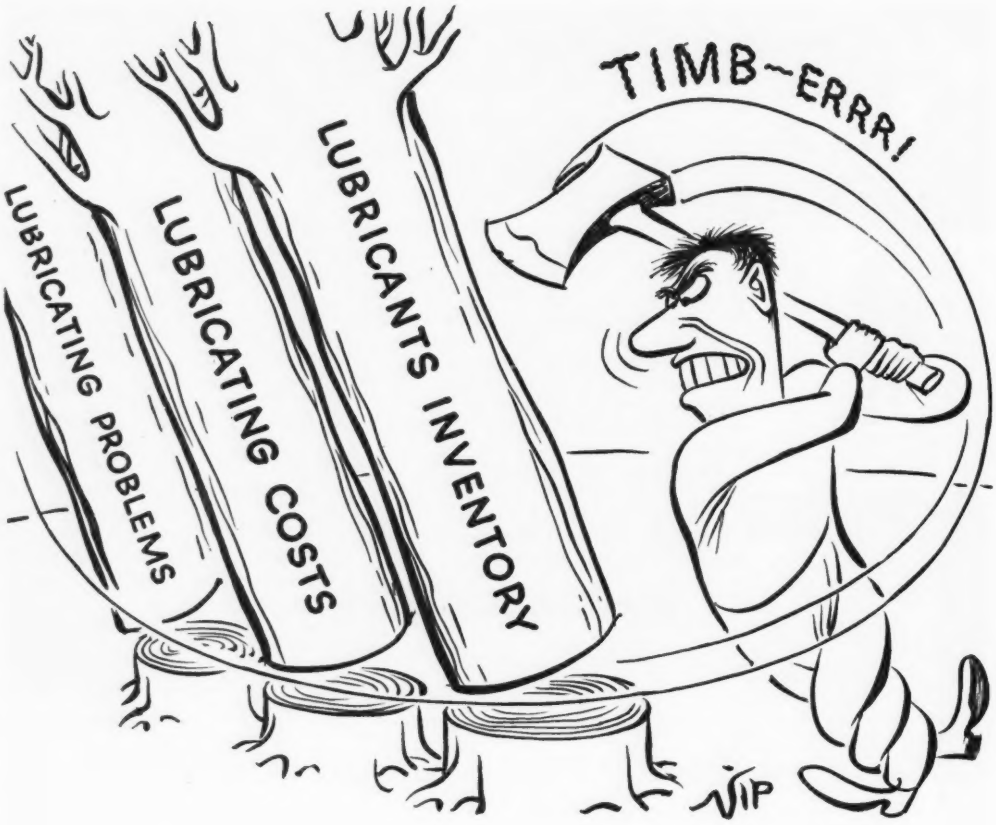

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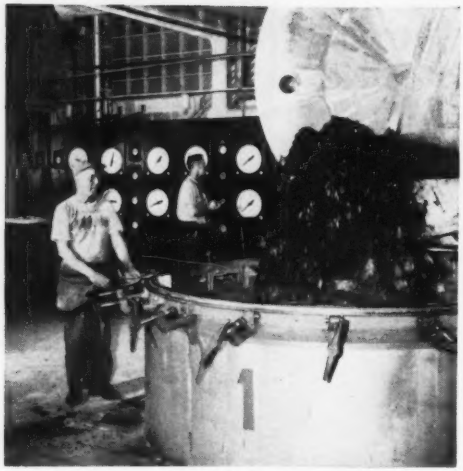
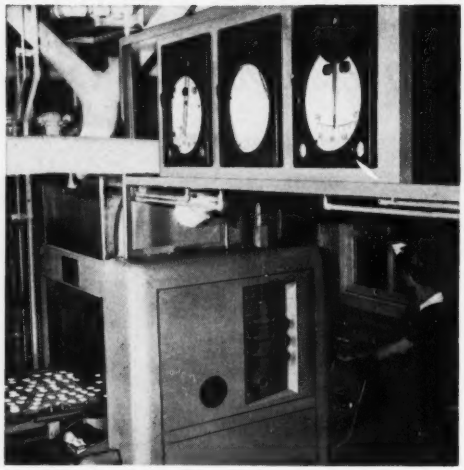


EXACT COLOR MATCHING *is important to quality carpet manufacturing . . . and depends, in part, upon the rigid maintenance of proper time and temperature schedules in the raw stock dye kettles. These* **ElectroniK** *controllers keep the schedules uniform and reproducible.*

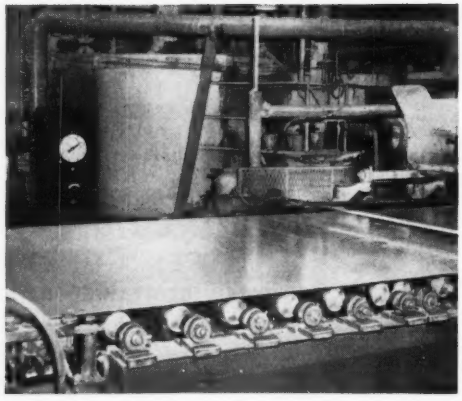


AUTOMATIC ENROBER CONTROL *system keeps the temperature of chocolate at precisely the proper point . . . for the mass production of quality candy. This same plant uses an automatic long cycle tempering to condition the chocolate before it enters the enrobers.*

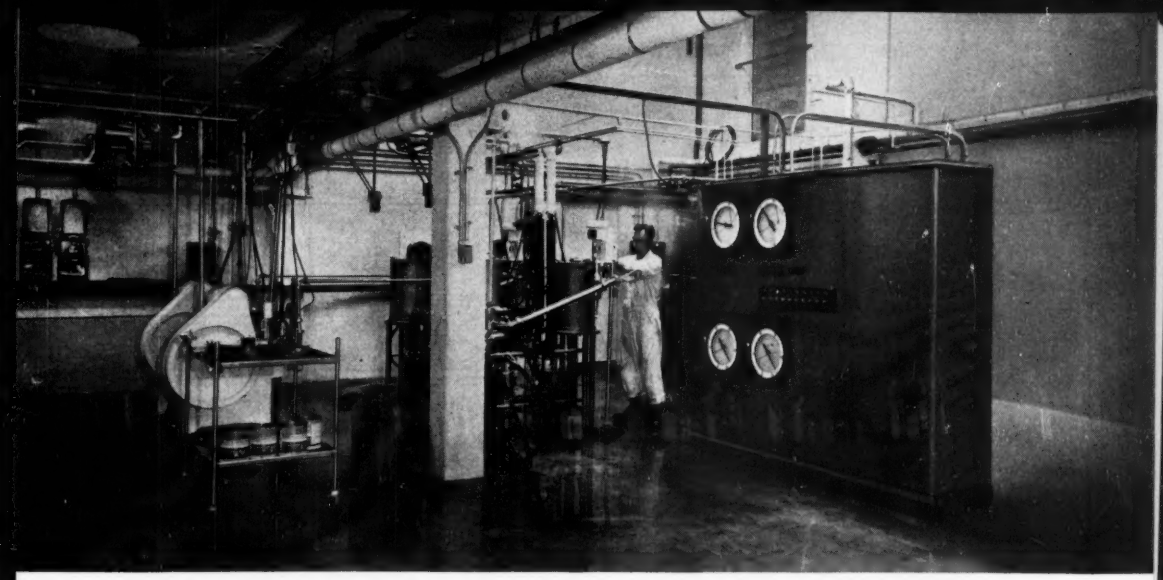
For all of industry . . . *especially*

Instruments

HIGH QUALITY *heat treating is a must for the dies used in precision forging of jet-engine turbine blades. These* **ElectroniK** *instruments provide the sensitive, accurate control of treating temperatures necessary for the meeting of exacting specifications.*



HOLDING PRODUCT QUALITY *at a high level is one of the many important functions of Brown instruments. The pH controller shown with this Fourdrinier machine is part of a complete control system which helps insure continuous production of top quality sheet and board.*



CANNING FRESH WHOLE MILK *is a new high-quality operation which utilizes remarkably compact processing equipment and an* ***ElectroniK*** *control system to establish and maintain sterile conditions.*

for the food industry

increase quality

INCREASED QUALITY of product goes hand in hand with the acceleration of research and speeding of production that modern instruments are helping to accomplish throughout the Food Industry. And Brown instruments, featuring *ElectroniK* control, are leading the way to higher and higher standards of performance, particularly among the more revolutionary processes.

The ingenuity and experience gained through many years in all types of industrial activity, plus specialized knowledge of food processing applications, enables Honeywell to bring some of the toughest quality problems of the industry under automatic control.

A good case in point is the Aseptic Canning Process, developed by Dr. Martin of the James Dole Engineering Company, which requires split second and exact temperature control in the heat exchanger, with continuous temperature measurement at 8 different points. The special control system devised by Honeywell for this precedent-shattering process is already playing an important role in the economical production of top-quality products.

Other major improvements are being made in a great variety of food processing operations . . . and Honeywell engineers are continuing to cooperate with scientist and production man alike, to speed the newer techniques from the laboratory to actual process use. Our local engineering representative will welcome the opportunity to discuss advanced instrumentation for your processing operations . . . and he is as near as your phone.

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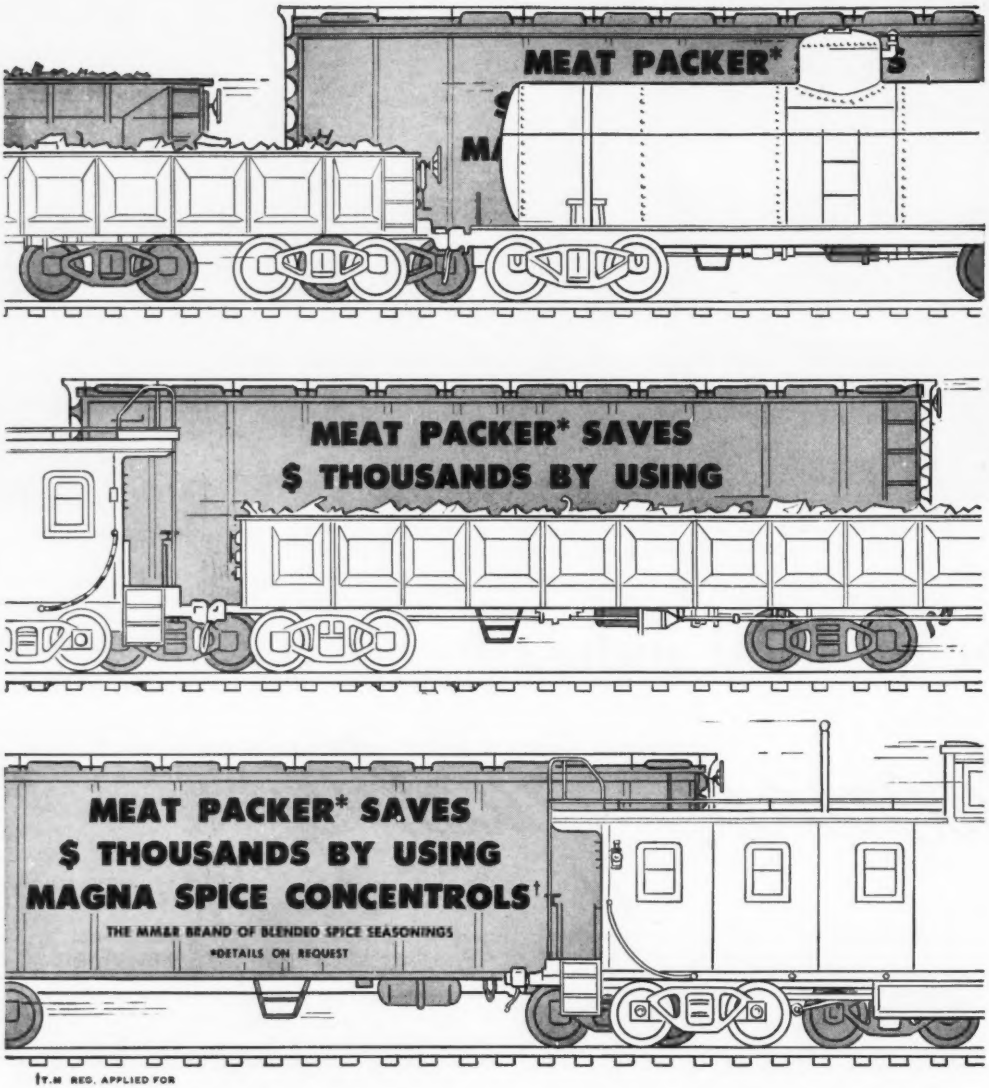

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● YOU, too, can cut food seasoning costs — 20% to 40% according to MAGNA users. At the same time, you'll assure absolutely uniform seasoning — batch after batch. That goes whether you're processing meat, catsup or any other product that calls for spice seasoning.

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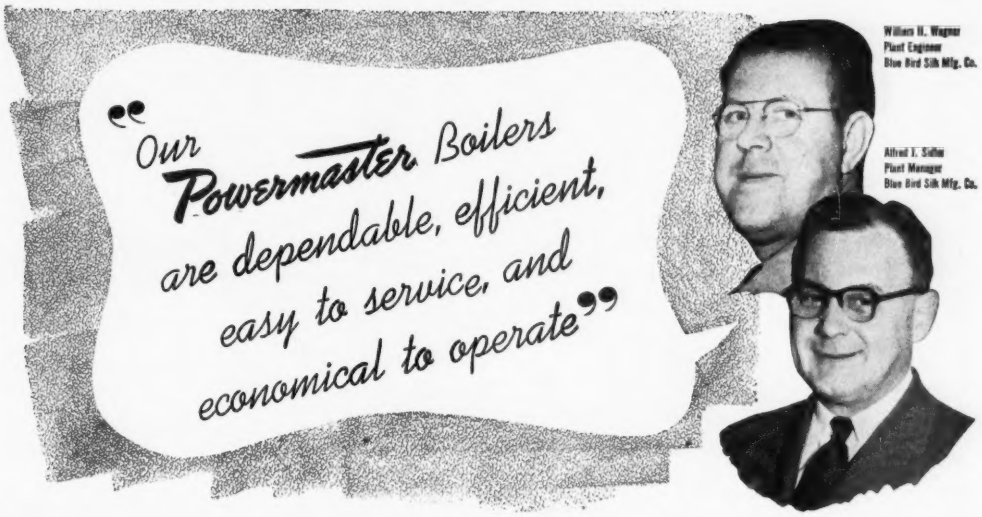
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Blue Bird Silk Mfg. Co.

20% Saving in Steam Cost at York, Pa. Manufacturing Plant

William H. Wagner, Plant Engineer of the Blue Bird Silk Manufacturing Company, knows the problems of generating high-pressure steam 24 hours a day, 365 days a year. And he knows how serious it can be for a busy manufacturing plant if there is trouble or failure in the boiler room. That's why, two years ago, the company replaced their old-fashioned coal-fired boilers with two 200 h.p. POWERMASTER packaged automatic boilers, burning #6 (Bunker C) oil. Here is what they found:

- The cost of producing steam for processing and heating dropped 20%.
- The steam produced now is much dryer.
- The POWERMASTERS respond very rapidly to variations in load.
- Maintenance has been negligible.

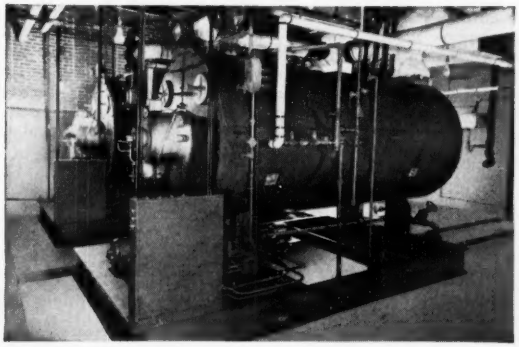
Little wonder that Alfred J. Sidler, Plant Manager, says, "If we had it to do over again, we would certainly buy POWERMASTERS."

No other packaged automatic boiler gives you *all 3 advantages of the Powermaster:*

1. SAVE FUEL—because the special *Powermaster* burner design gives you top efficiency when operating anywhere between 30% and 100% of capacity.
2. SAVE IN MAINTENANCE and clean-up time. Complete combustion of fuel gives practically smokeless and carbon-free operation. The burner has *no* moving parts to wear out . . . or to be cleaned daily.
3. CHANGE FROM OIL TO GAS (or gas to oil) in just a few minutes. Burn light oil, heavy oil, or gas—whichever is cheaper. You no longer need depend on one source of fuel supply.

Write for this Catalog

To get complete information about this modern packaged automatic boiler for steam or hot water, write for *Powermaster* Bulletin 1218. We'll be glad to put a copy in the mail for you.



These 200 h.p. POWERMASTER packaged automatic boilers have been operating round-the-clock for more than two years at the Blue Bird Silk Manufacturing Company, York, Pa. Burning #6 oil, they produce a total of 13,800 pounds of steam per hour.

Powermaster®

PACKAGED AUTOMATIC BOILERS

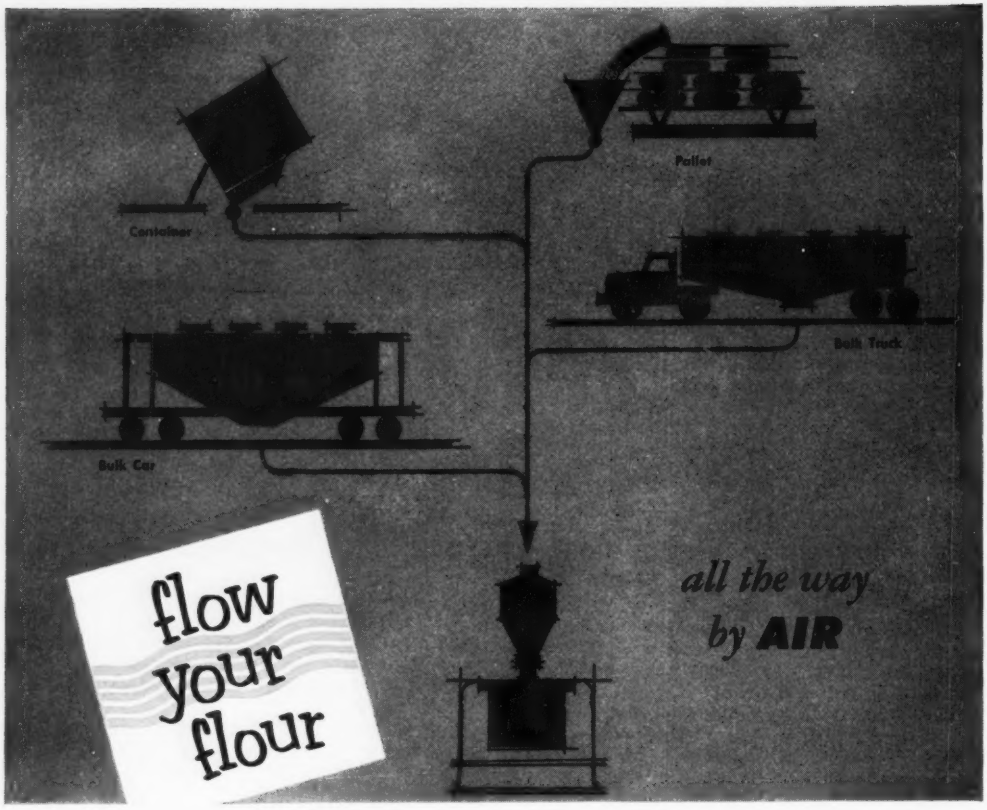
In sizes to 500 h.p.; pressures to 250 psi.

ORR & SEMBOWER, INC.

Established 1885

940 Morgantown Road, Reading, Pa.

For more information, use post card on last page.



...from the unloading dock to mixer with The AIRVEYOR®

Fuller

CONVEYS BY AIR

...NOTHING MOVES BUT THE MATERIAL

Conforms to "Sanitary Standards for Flour Handling Equipment."

A 154
1807

Not only white flour—but rye, graham, cracked and whole wheat, as well as powdered milk, and sugars are handled rapidly, at less cost and without contamination using Fuller Airveyors.

Moved by Air through sealed piping, which automatically cleans itself, Fuller systems insure long time operation without much attention, insurance against dust hazards.

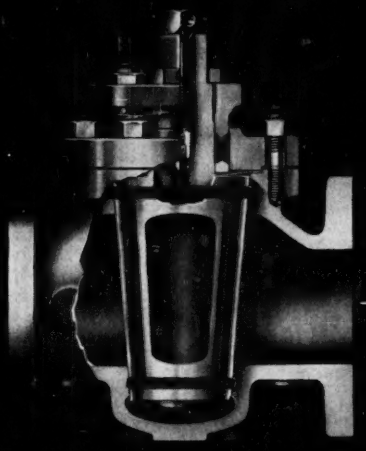
You get not only the convenience of push-button control—but also the advantages of rapid delivery of materials from unloading dock to storage or to mixers—under completely sanitary conditions.

And remember this, once installed Fuller systems will work for years with little attention. Every baker—small or large—can save again and again with Fuller Air Systems at work.

The day Fuller systems begin working for you, is the day you start saving—cancel out unsanitary open handling conditions—further improve your whole plant operation. Write today for complete information.

FULLER COMPANY
Catasauqua, Penna.

THE FRED D. PFENING COMPANY
Columbus 8, Ohio
Distributors to the baking industry in the U. S. and Canada



LUBRICATED PLUG

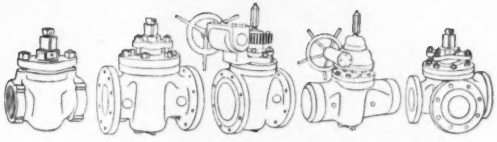
COMPLETE LINES OF LUBRICATED PLUG VALVES

Because of the wide range of services to which Lubricated Plug Valves can be adapted, they may be classed as "all-purpose" valves. Walworth manufactures complete lines of Lubricated Plug Valves in a variety of types and materials for working pressures up to 5,000 psi and for vacuum services. Sizes range from ½ to 30 inches. Write for descriptive literature.

Walworth also manufactures complete lines of gate, globe, angle, and check valves made of steel, bronze, iron, and special alloys.

Walworth valves, pipe fittings, and pipe wrenches total approximately 50,000 items and are sold through distributors all over the world.

Walworth engineers will be glad to help you with your problems. Call your local Walworth distributor, nearest Walworth sales office, or write to our General Offices, 60 East 42nd Street, New York 17, New York.



Illustrated in section is a Walworth No. 1700F Regular Gland Type, Wrench Operated, Steeliron, Lubricated Plug Valve. This particular line of valves has a working pressure rating of 200 psi at 150F or 125 psi at 450F. Sizes range from ½ to 8 inches. Other Walworth Lubricated Plug Valves include Single Gland and Ball Bearing types. They are available for a variety of working pressures.

For best results use Walworth Lubricants and Walworth High Pressure Lubricant Guns.

WALWORTH

Manufacturers since 1842

valves . . . pipe fittings . . . pipe wrenches

60 East 42nd Street, New York 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

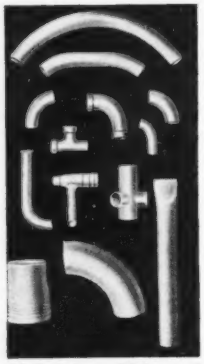
1

Rectangular Wave Guides made by TRENTWELD

2

Type 316 TRENTWELD Stainless Steel tubes are used in this Heat Exchanger fabricated by Kewanee-Ross Corp., Buffalo, N. Y.

any need for stainless or high alloy steel tubing is better served with **TRENTWELD**



3

A baker's dozen of fittings made from TRENTWELD tubing

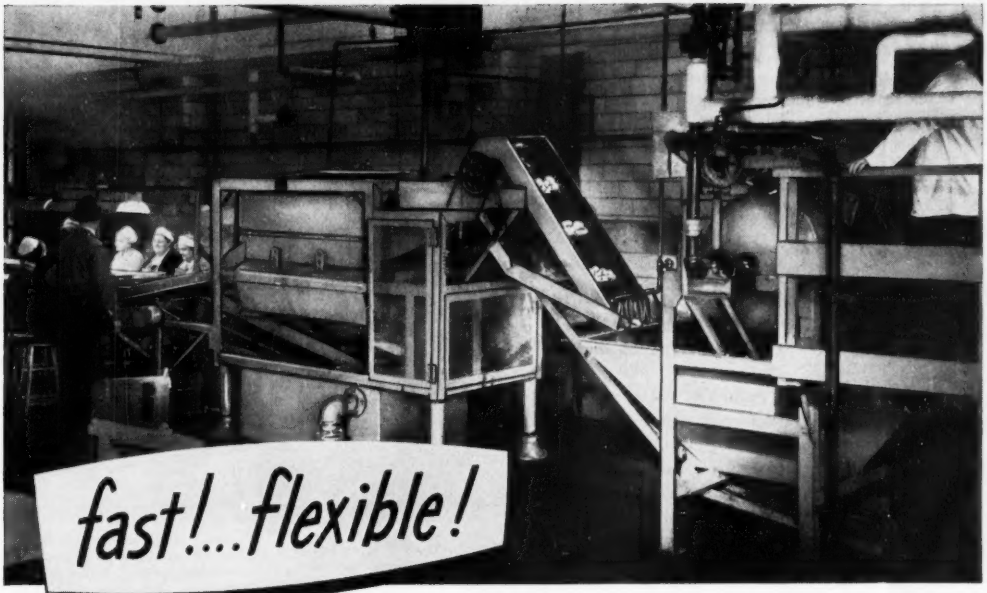
Name the need for special types, forms or finishes of stainless or high alloy steel tubing and the name to associate with it is TRENTWELD. For throughout all industry you'll find TRENTWELD meeting exacting requirements in these highly specialized fields. That applies to stock lines in food, paper and chemical plants. It is true of heat exchanger units in processing industries; and in cooling coils in breweries, the beverage industry, dairies and dairy equipment.

TRENTWELD is available in a wide range of wall thicknesses; in a variety of grades, gauges and finishes. Call us for any requirement in stainless or high alloy tubing. Our engineers can help you.

TRENTWELD

STAINLESS STEEL TUBING

TRENT TUBE COMPANY, GENERAL SALES OFFICES, EAST TROY, WISCONSIN (Subsidiary of CRUCIBLE STEEL COMPANY OF AMERICA)



Pfaudler Contour Steam Peelers

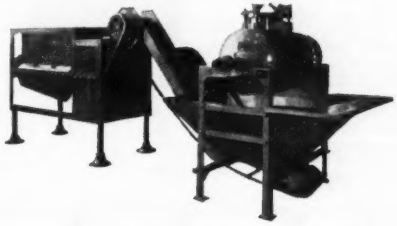
2000 TO 8000 POUNDS PER HOUR—White potatoes, sweet potatoes, carrots, and other root vegetables can be peeled at a rate of from 2000 to 8000 pounds per hour with the Pfaudler steam peeler. The skin is cleanly removed by steam and water alone . . . no chemicals or abrasives are needed.

ACCURATE CONTROL—The peeling depth can be accurately controlled. This cuts trimming losses and increases your product yield. And with the Pfaudler contour steam peeler, a smaller trimming line is required. This helps to keep operating costs at a minimum.

RUGGED CONSTRUCTION—The pressure chamber is built of all welded steel, insulated with 2-inch cork board and covered with heavy steel sheathing. Steel-lined peeler unit has supporting steel frame with adjustable legs.

The Pfaudler contour steam peeler is now being used by such companies as H. J. Heinz, Beechnut, Baumer Foods, and Evangeline Pepper and Food Products. Just send us the handy coupon for full details.

Vegetables are exposed to steam in a revolving retort and then conveyed over vari-speed rubber rollers which push and gyrate them. Water from high-pressure jets removes skin.



Pfaudler

THE PFAUDLER CO., ROCHESTER 3, NEW YORK
Engineers and Fabricators of Food Processing Equipment

Gravity Fillers · Deaerators
Piston Fillers · Vacuum Pans
Steam Peelers · Evaporators

THE PFAUDLER CO.
Dept. FE-11, Rochester 3, N. Y.

Send me details on Pfaudler contour steam peeler.

NAME_____

TITLE_____

COMPANY_____

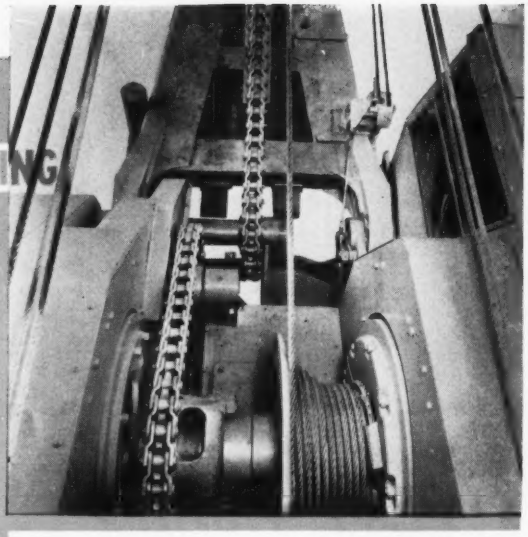
ADDRESS_____

CITY_____ ZONE____ STATE____

just a few Jeffrey products . . .

FOR IMPROVING HANDLING AND PROCESSING

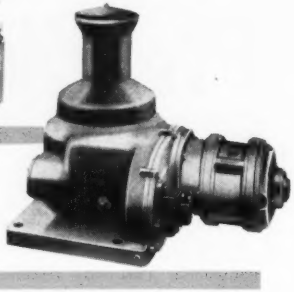
Space does not permit a complete showing of all the products in the broad Jeffrey line. A few are displayed here to give you an idea — our NEW Catalog No. 418 goes into more detail. It will prove a handy reference if you are interested in improving handling, processing and reducing operations in your plant. Send for your copy TODAY.



Above: A complete line of Chains and Transmission Machinery . . . bearings, idlers, traction wheels, take-ups, sprockets, gears, hub boxes, couplings, etc.

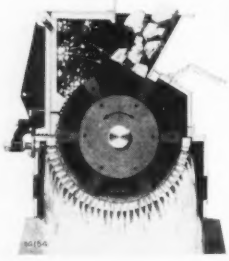
BUCKET ELEVATORS—standardized to save you time and money. A type and size, buckets mounted on belt or chain, to give your material a lift . . . to keep production moving in a way that spells more profit for you.

Below: Jeffrey-Traylor Barrel Packer. Cuts shipping costs—reduces size of container as well as increases its capacity. Also electric vibrating Packing Tables, Feeders, Conveyors, Dryers and Coolers.

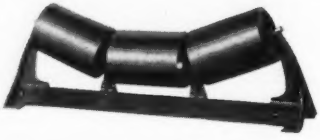


CAR PULLERS—two sizes for moving from one to six cars. Save time and expense. No locomotive needed.

PULVERIZERS AND CRUSHERS—Rigid or swing hammer, single or double roll, FLEXTOOTH or Rotary Ring types to provide uniform reduction with a minimum of fines. Reduce coal, limestone, gypsum, pulp lap, garbage, metal turnings, alum, chips, sewage screenings, sugar cane, to desired fineness the Jeffrey way.



BELT IDLERS—furnished in both troughing and flat belt types for belt widths from 14" to 60". Idlers are of the anti-friction type, insuring low power cost and smooth performance.



THE JEFFREY MANUFACTURING COMPANY

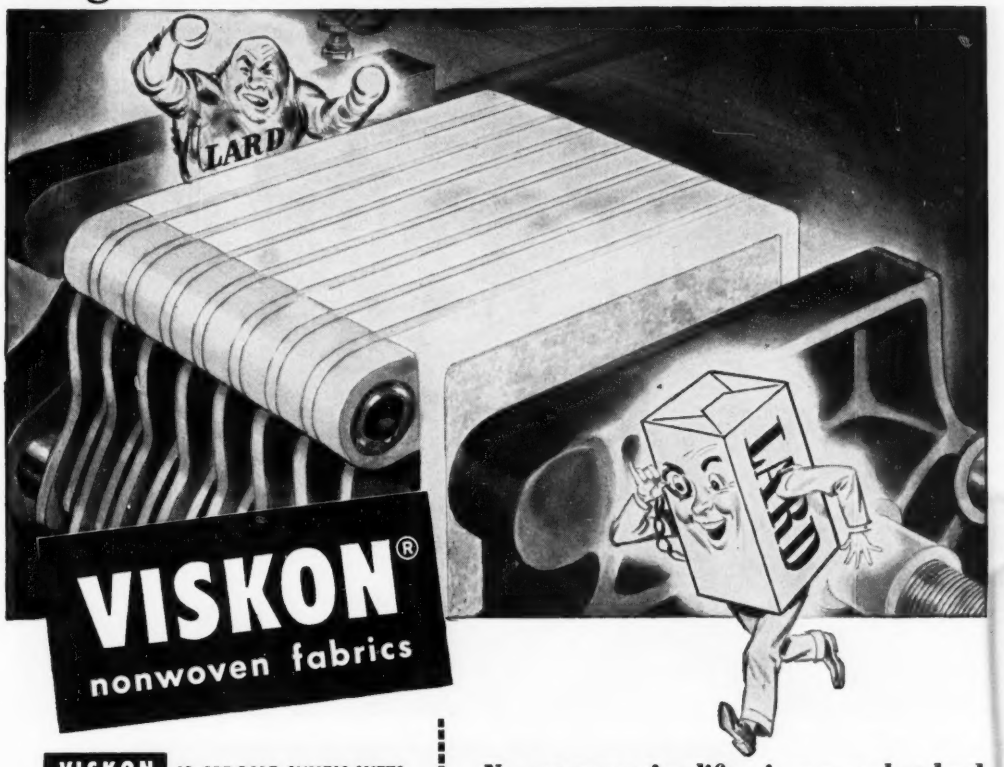
1877 75 YEARS 1952

927 North Fourth St., Columbus 16, Ohio

Baltimore 2 Boston 16 Cincinnati 2 Detroit 13 Houston 2 New York 7 St. Louis 1
Beckley, W. Va. Buffalo 2 Cleveland 15 Forty Fort, Pa. Jacksonville 2 Philadelphia 3 Salt Lake City 1
Birmingham 3 Chicago 1 Denver 2 Harlan, Ky. Milwaukee 2 Pittsburgh 22

Jeffrey Mfg. Co. Ltd., Montreal, Canada — *The Galion Iron Works & Mfg. Co., Galion and Bucyrus, Ohio*
British Jeffrey-Diamond Ltd., Wakefield, England — *Galion (Great Britain Ltd.), Wakefield, England*
Jeffrey-Galion (Pty.) Ltd., Johannesburg, S. A. — *The Ohio Malleable Iron Co., Columbus, Ohio*
The Kilbourne & Jacobs Mfg. Co., Columbus, Ohio

Tough Customer turns out Refined and Polished!



VISKON®
nonwoven fabrics

VISKON IS STRONG WHEN WET!

A great advantage over paper filters—offers high wet strength, longer filter life, greater dependability.

VISKON IS DURABLE!

Insoluble in common organic solvents—ideal for use under high pressure and heat conditions.

VISKON HAS HIGH FLOW RATE!

Gives maximum flow rate with required clarity. Filtering cycle is lengthened.

VISKON IS ECONOMICAL!

Reduces clean-up time—speeds up production—costs less than woven fabrics.

VISKON nonwoven fabrics

. . . another product to fit today's needs by

THE VISKING CORPORATION
NORTH LITTLE ROCK, ARKANSAS

New VISKON simplifies, improves hot lard refining for major packing house*

Filtering and polishing hot lard under high pressure was a tough problem for a leading midwestern meat packer. Then they switched to **VISKON** nonwoven rayon fabric backed with regular canvas ducking. **VISKON** performed the final polishing job with high efficiency—throughout the entire filtering cycle. Down time for cleaning and dressing was greatly reduced.

VISKON is insoluble in common organic solvents, has exceptionally high flow rate, porosity and resistance to deterioration. And, with all these important advantages, **VISKON** *is economical!*

VISKON is made from textile fibers bonded with cellulose, either cotton or rayon or a combination of both. Whatever your individual needs, **VISKON** can do a better job for you.

Investigate today . . . write for complete information.

**Name in Our Files*

Please send us additional information and samples of VISKON nonwoven fabrics.

THE VISKING CORPORATION, DEPT. FD
Box 72, North Little Rock, Arkansas

Name.....
Position.....
Company.....
Address.....
City.....*Zone*...*State*.....
Name of equipment used.....

For more information, use post card on last page.

Prevent costly breakdowns

Spoilage cuts your profits

It will pay you to Specify Thermoid

Typical of Thermoid's quality and attention to detail are the conveyor and elevator belts made specifically for canners and other food handlers. They are acid resistant. Impart no taste or odor to foods being processed whether fruit, fish, meat or vegetables.

Thermoid belts are built to stay on the job—day in, day out. Handle peak loads and avoid costly breakdowns that result from the use of ordinary belting.

Call your Thermoid distributor to help you select the belt that will serve your needs most economically. Or write direct for a copy of Thermoid Conveyor Belting Catalog No. 3679. The right Thermoid belt in the right place will do the job *better*.

Conveyor & Elevator Belting • Transmission Belting
F.H.P. & Multiple V-Belts • Wrapped & Molded Hose

Thermoid

Rubber Sheet Packings • Molded Products
Industrial Brake Linings and Friction Materials

Thermoid Company • Offices & Factories: Trenton, N. J., Nephi, Utah

Raise the Taste Level

of CANNED SOUPS and STEWS with

Huron MSG

...and boost SALES

Past experience is a safe guide to food manufacturers in evaluating the advantages of HURON MSG especially in the processing of canned soups and stews. Having pioneered in 1934 a new way to make good foods taste even better, HURON can today offer eighteen years specialized experience in raising taste level as a basic means of boosting sales.

Technical know-how in the application and use of a time-proved product, HURON MSG, is at the command of your food technicians to help win even greater acceptance and sales volume for your canned soups and stews.

THE HURON MILLING COMPANY • 9 PARK PLACE, N.Y.C. 7

Factories: Harbor Beach, Michigan

Sales Offices: 161 E. Grand Ave., Chicago 1 • 383 Brannon St., San Francisco 7 • 13 E. Eighth St., Cincinnati 2

on Allegheny Metal Plates

For certified data on individual grades of Stainless Steel, use

ALLEGHENY LUDLUM BLUE SHEETS

There is a Blue Sheet for each individual grade of Allegheny Metal, giving full information on its physical and chemical properties and characteristics. Let us send you this certified, laboratory-proved data on the stainless grades in which you are interested.

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WRITE FOR YOUR COPY!

For any job which involves the handling of large volumes, heat and high pressures—either singly or all at one time—Allegheny Metal solid or clad plates are produced in the exact stainless grade required to combat corrosion, oxidation and contamination of the product.

Some of these grades are *new* . . . comparatively recent developments of our research and experience as a pioneer and leader in stainless steel production. Others are improved versions of older analyses. The latest information on the entire subject of stainless plates is available to you in the booklet illustrated above—32 pages of valuable data on types, sizes, finishes, fabricating methods and uses, including ASTM and ASME boiler codes.

Specify "Allegheny Metal" for complete reliability in stainless steel plates, and write for your copy of the A-L Plate Book. ● *Address Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pennsylvania.*

You can make it **BETTER** with

Allegheny Metal

WAD 4877

TIME-TESTED STAINLESS STEEL

Over 80 years ago, John Herman Pine first recognized, through self-treatment of a throat irritation, the demulcent . . . emollient . . . and hygroscopic properties of U.S.P. Glycerine. Today, Glycerine and Pine Bros. are virtually synonymous to a large segment of the general public . . . and consumer interest and acceptance is steadily increasing, as reflected in years of continuous sales increases.

FULLY ACCEPTED . . . FULLY AVAILABLE IN ALL GRADES!

U.S.P. Glycerine serves the manufacturer of pastilles, confections and foodstuffs in a variety of ways! For instance, it acts as an ideal vehicle and blending agent for the five flavors that now make up the Pine Bros. family. Each tablet is uniform in appearance . . . uniform in taste! And versatile Glycerine—blended with Acacia, flavoring and other components—serves as a natural sweetener as well!

U.S.P. Glycerine, as a solvent and extractant for base flavors, is widely favored by extract manufacturers. It adds smoothness to mixtures . . . and distributes flavors uniformly. Even in the field of packaging materials, Glycerine has come to be an important component of wraps that come in contact with food products.

So it is today with dozens of familiar food brands . . . U.S.P. Glycerine often performs two or more functions—preserving freshness or making food products more palatable. In every instance, Glycerine is used with absolute confidence, since *it is actually a wholesome nutrient for food use!* "Why Glycerine for Foods?" tells the story of these many applications . . . why not write for a copy?

GLYCERINE PRODUCERS' ASSOCIATION
295 Madison Avenue, New York 17, N. Y.

on Allegheny Metal Plates

For certified data on individual grades of Stainless Steel, use

ALLEGHENY LUDLUM BLUE SHEETS

There is a Blue Sheet for each individual grade of Allegheny Metal, giving full information on its physical and chemical properties and characteristics. Let us send you this certified, laboratory-proved data on the stainless grades in which you are interested.

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GLYCERINE PRODUCERS' ASSOCIATION
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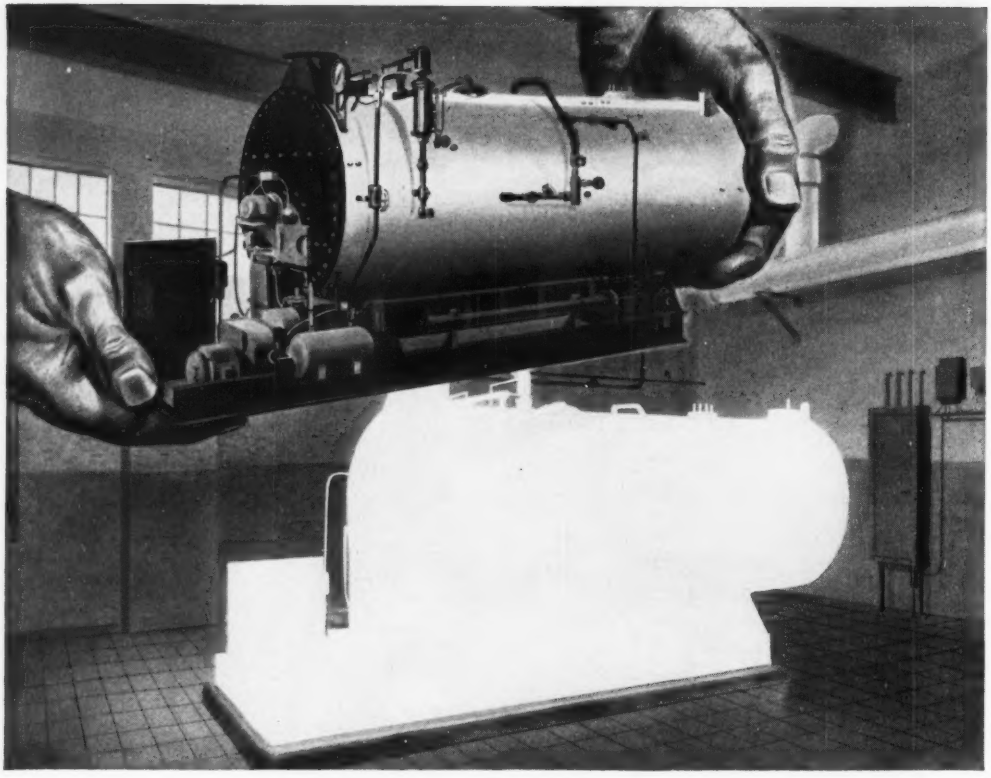
Ready when you need it...



Save Installation-Construction Time — Expedite Emergency Installations — Serve Immediate Temporary Steam Needs — With a Cleaver-Brooks Self-Contained Boiler

WHEN speed is vital, you can save weeks of valuable installation time with a Cleaver-Brooks boiler — delivered to location as a complete, factory assembled and tested, self-contained unit, with much of the trim and accessories provided.

In an emergency the installation time can be reduced to as little as 48 hours, by following a properly planned and coordinated procedure of providing in advance the required facilities — foundations, headers, service and blow-off lines, fuel tanks and lines.

Prior to the completion of your building, Cleaver-Brooks boilers can be placed in operation to serve immediate steam needs. When permanently installed the change-over takes place with a minimum of labor and expense and the avoidance of interrupted steam service.

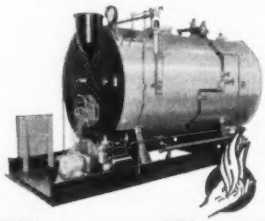
Cleaver-Brooks are the first and finest in modern, self-contained boilers — operate at a guaranteed efficiency of 80% — burn the fuel most available and economical in your area, gas, oil, or combination gas and oil — fully meet all codes — standard models available in sizes 15 to 500 hp; 15 to 250 psi.

CLEAVER-BROOKS COMPANY
Originators of the Self-Contained Boiler
Dept. M-354 E. Keefe Ave., Milwaukee 12, Wis., U.S.A.
Cable Address: Clebro-Milwaukeewis

See Cleaver-Brooks Exhibition Booth 7-W
20th National Power Show
New York—December 1-6

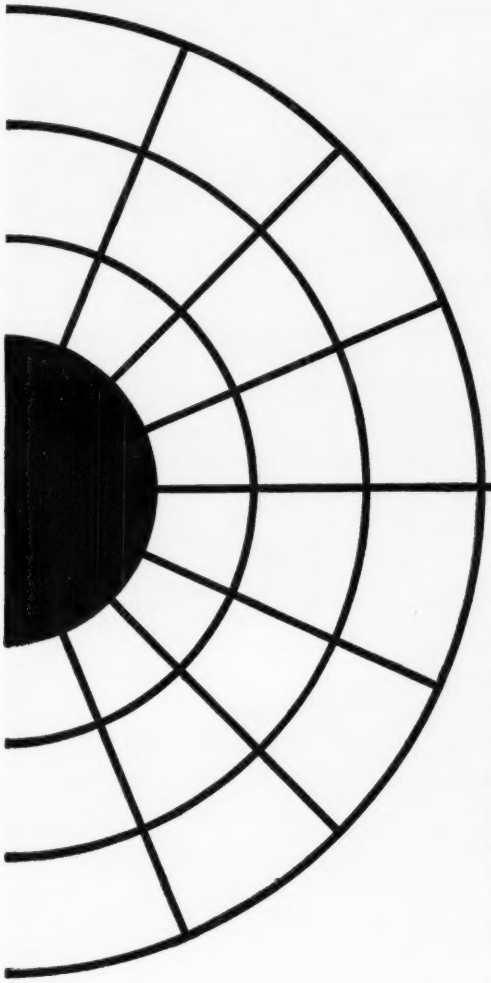
WHY INSTALLATION TIME IS CUT:

- Simple Low-Cost Stack
- No Job-Site Brickwork — No Special Foundations
- Boiler Delivered as a Complete, Factory Assembled, Tested, Self-Contained Unit
- Centralized Responsibility — No Waiting on Multiple Sources of Supply



Cleaver-Brooks

Builders of Equipment for the Generation and Utilization of Heat • Steam Boilers • Oil and Bitumen Tank-Car Heaters • Distillation Equipment • Oil and Gas-Fired Conversion Burners



Bemis Now Offers You

Quantacolor

. . . to give your printed brand "MORE SELL"

You can get the sales benefits of QUANTACOLOR in your branded bags FROM BEMIS ONLY. It adds nothing to your bag cost. This is another extra Bemis service to make your brand sell better and more profitably.

What is Quantacolor?

Quantacolor is a scientific yardstick for making certain that the colors combined in any design or product are in harmony . . . that they *look right* together. Nature creates colors in four Quantas . . . and there are all colors of the spectrum in each Quanta. Colors from the same Quanta are *pleasing* together. Colors from different Quantas are *displeasing* together. Very slight changes, sometimes scarcely noticeable, will put a color into the Quanta that *agrees* with its companion colors.

Does Quantacolor actually help sell?

It has proved its sales value in many types of packaging and merchandise.

Does Quantacolor mean you must redesign your brand?

Not at all. Maybe your brand colors are in perfect harmony now. If so, Quantacolor will confirm it. If not, a slight change of a color will probably suffice.

Whether you use Bemis Paper Bags, Cotton Bags, Burlap Bags or Plastic Bags . . . you will benefit from Quantacolor. Ask for the details.

Bemis

BEMIS BRO. BAG CO.
408-C Pine St., St. Louis 2, Mo.

Give me details about Quantacolor and how it will help sales.

*Name*_____

*Company*_____

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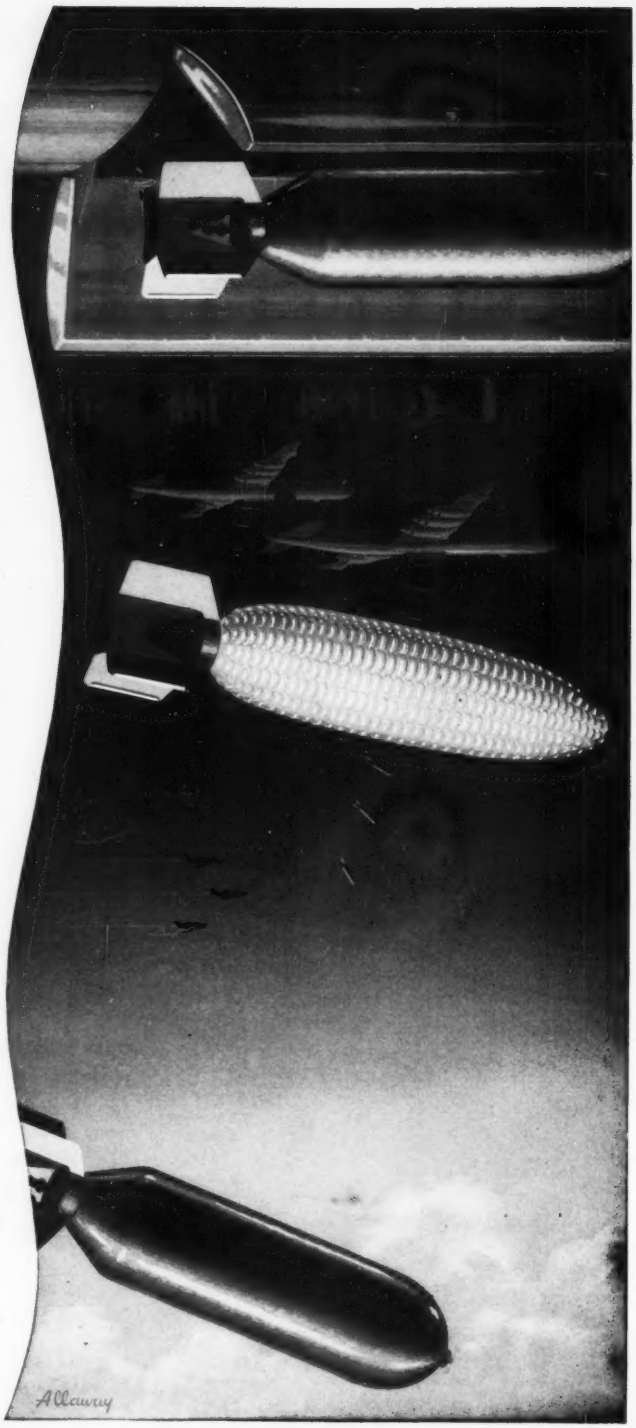

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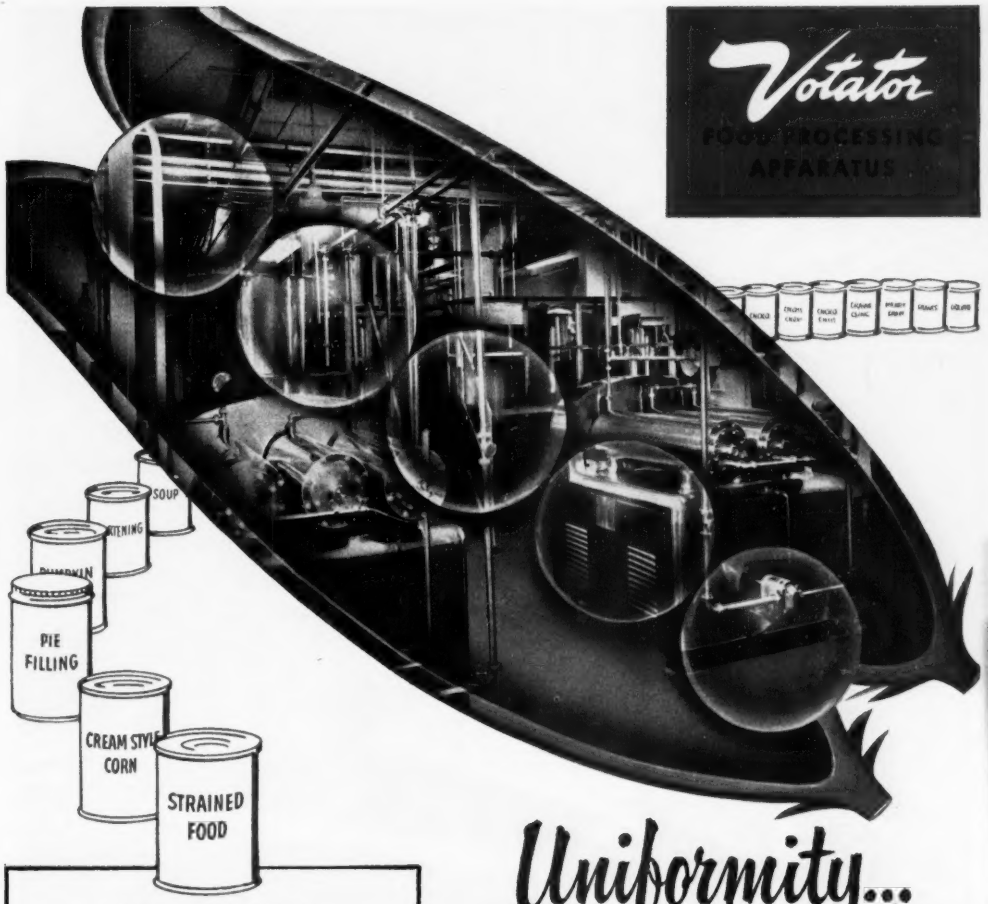

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Invert Syrup	Cooling and Crystallizing of Sugars
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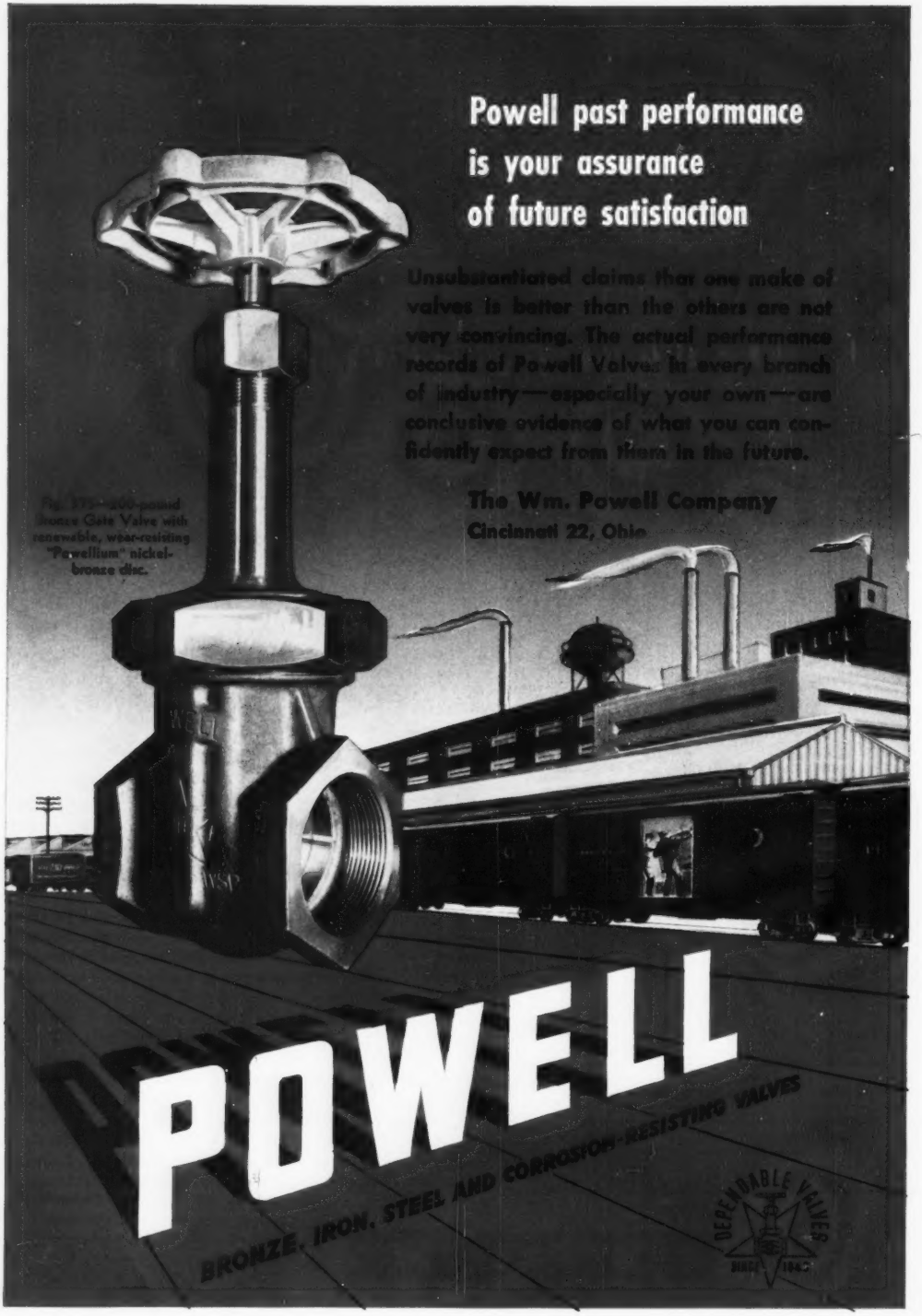
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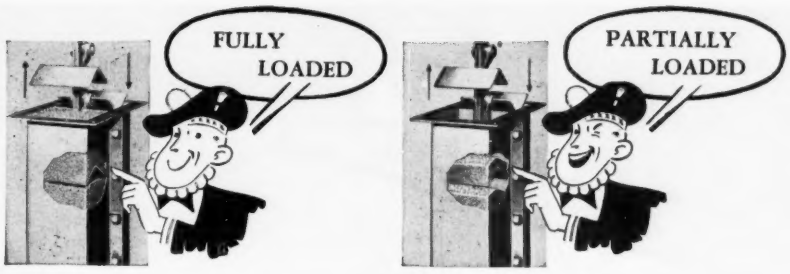

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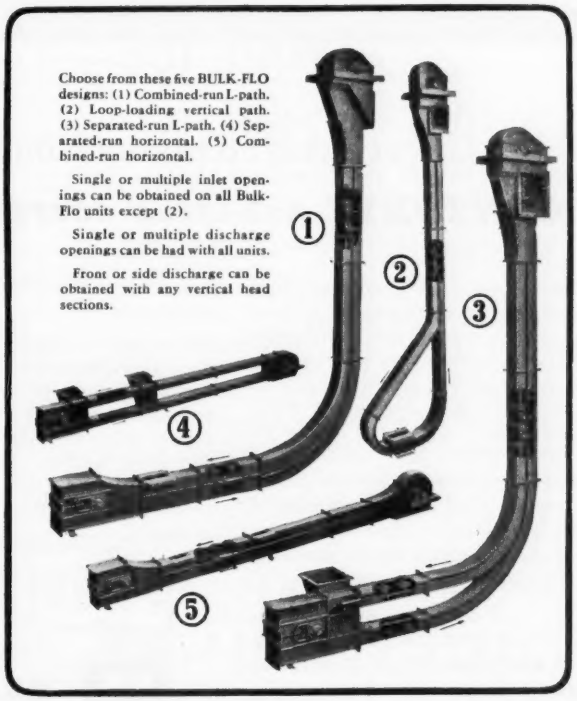
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1
2
3
4
5

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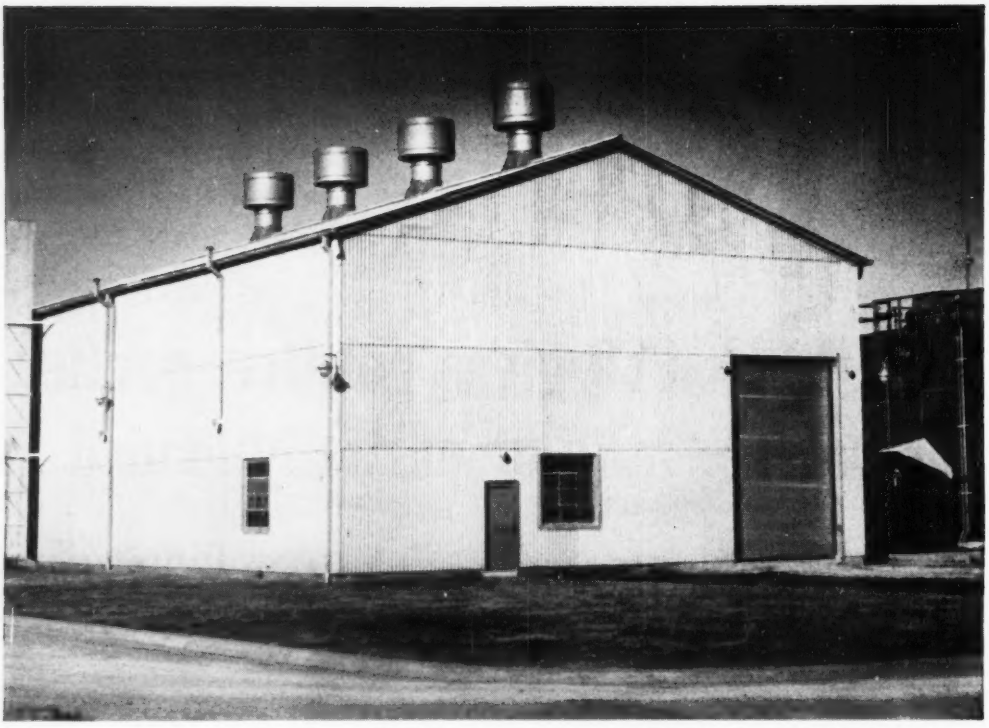

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"Stretches cloth life with just a handful of CELITE"

From a Celite Field Engineer's report on apple pressing

"THE FOREMAN of this apple pressing plant in my territory is well satisfied with the benefits obtained since they began to sprinkle a handful of a Celite* Pressing Aid on the cloths before pressing.

"Now when the cloths are opened up, the cake snaps out cleanly—they no longer have to beat them with sticks to remove the pomace. Washing is required less frequently, with the net result that cloth life has been greatly increased."

• • •

Longer cloth life is one of several money-saving reasons why more and more fruit processors are using Celite Pressing Aids. Faster production, clearer juice and higher yields are other important benefits that are obtained when these diatomite powders are added in small amounts to the pulp before pressing.

HOW CELITE PRESSING AIDS WORK

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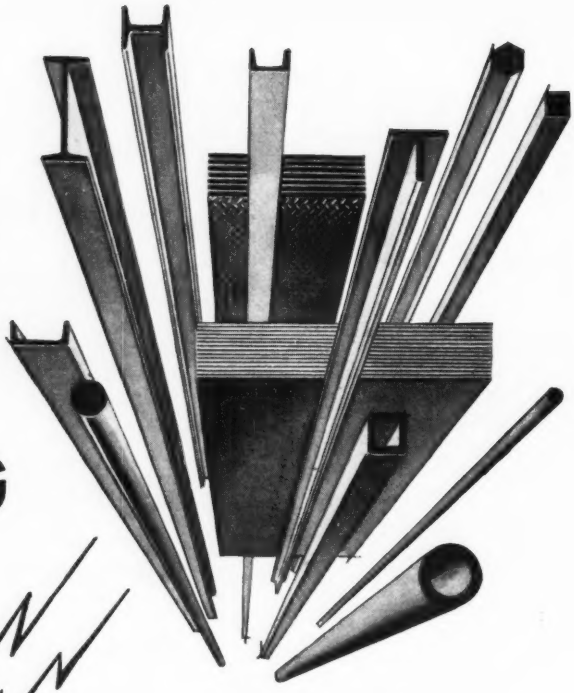

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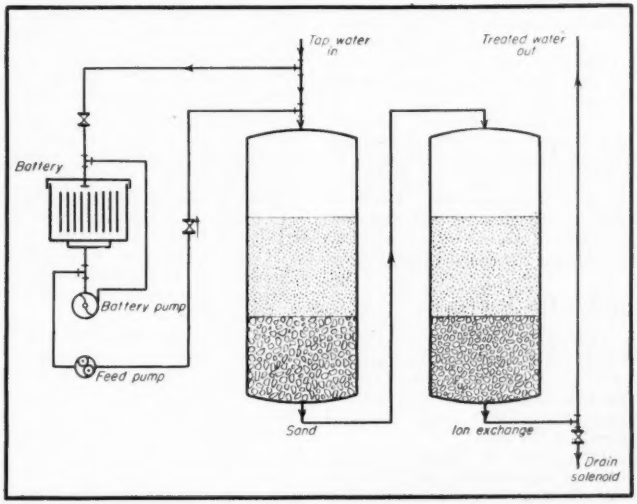


FIG. 1. How electrochemical treating system operates. Electrolytic aluminum hydroxide, generated from metal in battery (left), is added to tap water as it flows to sand filter (center). Here, organic matter is adsorbed by the hydroxide. Ion exchange unit (right) reduces hardness or alkalinity.

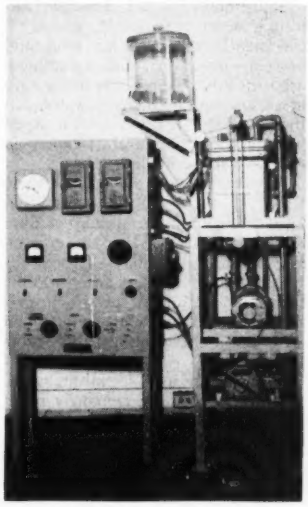


FIG. 2. How generator looks. Box (left) contains electric controls for battery (top right), battery pump, feed pump. Jar holds sterilizing solution.

Improved Water Treatment

Ups Beverage Quality . . . Other Food Uses Seen

Gives soft drinks small-bubble carbonation, better palatability, and flavor. Longer shelf life, too . . . Further uses are now seen in brewing, also in processing of dairy items, fruits, vegetables, meats, and fish

PAUL S. ROLLER
Technical Director, General Hydro Co., Washington, D. C.

Today, in a number of soft drink bottling plants, a new method of electrochemical water treatment is proving unusually successful.

It is decreasing foaming at the filler with a resultant increase in the rate of bottling—as high as 10-15 percent has been reported—and a saving of up to 25 percent in dry ice for CO_2 production.

Beverages made with this water acquire "small bubble" carbonation, corresponding to a retarded release of the supersaturated gas. They retain the carbonation better on standing, and thus have improved palatability.

Flavor and shelf life have also been improved as the result of removal of organic matter from the water.

Other bright possibilities concern brewing, dairying, fruit and vegetable, meat, and fish operations. Data are not yet available for such plants, but similar and perhaps just as striking improvements may be expected.

Uses Hydrolytic Aluminum

The treatment is related to the chemical coagulation method in that both are dependent on production of insoluble aluminum hydroxide.

In the electrochemical method, however, the aluminum hydroxide is formed directly from metal with the aid of an electric current, whereas in chemical coagulation soluble chemicals are employed with dependence on hydrolysis in solution to form the aluminum hydroxide.

The commercial application of electrolytic aluminum hydroxide necessarily had to await the development of an effective and durable electrolytic battery. This has now been achieved[3], and the method is being applied to treatment of tap water in a number of food and beverage plants.

It might appear that if city water is good enough to drink it should be good enough to use for processing foods and beverages. And this is true in many cases. For most municipalities do an excellent job of cleaning up raw water from rivers and other sources. In many instances this in-

volves going well beyond the need of providing a potable water meeting the minimum requirement of freedom from coliform bacteria.

Some municipalities, however, furnish a water that, while potable, is consistently unsuited for food and beverage processing, and accordingly needs treatment. And even in the case of an apparently good tap water, further treatment is desirable and necessary as protection against lapses in quality that inevitably occur.

There are several reasons for these lapses. For one thing, intermittent breakthroughs of the municipal filter due to poor coagulation causes overloading and air binding. This results in injection of organic matter into the filtered water, effects of which may become aggravated due to subsequent lodgment in the municipal distribution system.

Some of the microorganisms which may get through are extremely resistant to chlorination[2], and are both aerobic and anaerobic. Once in the system, they can develop in the pipe lines, particularly in low draft sections and dead ends.

Diverse microorganisms may enter into the distribution system from the service reservoir.

Depreciation of quality is also apt to occur seasonally. During the summer, algae tend to become exceedingly prolific. They may then overload the filter system and break through into the water supply. Coagulation is often difficult in the autumn, with the result that the floc is fragile and escapes with the water issuing from the filter. The cold of the winter also adversely affects coagulation.

Acute periods of contamination of the water at the tap occur when the distribution system is disturbed, such as during repairs to the mains, flushing of the pipe lines, and abrupt changes of pressure.

Unknown cross-connections to the mains are another source of secondary contamination.

During periods of rising temperature, microorganisms that are dormant in the pipe lines can become active, rapidly finding their way into the flowing water.

In the case of creamery products, and of stored meats, fish, butter, and other non-acid protein or fatty foods, the specific spoilage caused by tap water has been discussed[3, 4]. The flavor deterioration of soft drinks, and their unsightly appearance after storage, are well-known aftermaths of poor water.

Well-to-Tap Troubles

In the case of well water, the distribution system seems to have a great influence on quality. Although pure at the well, such water has been found to have unexpectedly high bacterial counts at the tap[5].

In addition to organic content, hardness and alkalinity are to be considered. These properties, inherent in raw water, are but little modified in municipal plant treatment or in the distribution system.

Excess hardness is considered, for example, to affect the turgidity and tenderness of some canned vegetables, the curdling of milk, the baking quality of flour, and the clarity of fruit syrups. Temporary hardness may give rise to precipitates during sterilization[4]. And, too high an alkalinity is unfavorable for soft drinks since it neutralizes the free acid.

Of the two properties, purification is always needed, either as a continuous measure or for defense against periodic deterioration. Conditioning may or may not be necessary, depending upon the particular requirements of the product.

It has long been known that aluminum hydroxide has the ability to adsorb organic matter (including bacteria[5, 6, 7]) from water. And because of this property, it is employed in water analysis to remove organic matter prior to testing for nitrate[8, 9]. Similarly, by filtering water with electrolytic aluminum hydroxide, the writer has caused the organic content, as measured by permanganate, to decrease to a negligible value.

However, this adsorption decreases with time, due to aging in which the amorphous form re-orients and converts into crystalline hydrargillite. Therefore, in electrochemical water treatment, only freshly generated material is employed.

Electrolytic aluminum hydroxide is, like alum, capable of coagulating foreign matter. A turbid river water, upon being stirred with it, soon shows the presence of the familiar floc. By treating sewage in this way, the writer has, without any adjustment for pH, removed 87 percent of its organic content, as measured by the BOD before and after.

In the electrochemical treatment of tap water, direct use is made of aluminum hydroxide's adsorptive power for organic matter, rather than its coagulating power. Immediately after generation, the aluminum hydroxide is added to the tap water, which then flows to a sand filter.

The situation is different with the soluble chemical, alum, (or copperas, when used in place of alum[10].) Hydrolysis and growth, beyond the molecular or amicron stage, requires a suitable narrow range of pH and mechanical agitation. In the absence of these conditions, the alum may go through the filter, resulting, as is well-known, in "acid water" and after-precipitation.

Even with a large coagulating tank, given ample opportunity for the prior formation of floc, the alum frequently passes through the filter. Aluminum hydroxide prepared electrolytically has dimensions which, while far smaller than for floc, result in its being fully retained in the sand filter. Other attributes, such as electrostatic charge, are possibly involved in its retention.

The sand filter used is a relatively open body, with a mean pore diameter of 0.2-0.3 mm. Particles of electrolytic aluminum hydroxide penetrate into the filter, cover the sand grains therein, and produce an activated filter, or artificial contact-bed, whose active element is the fresh aluminum hydroxide.

The sand filter, thus converted, is analogous to the old-time municipal slow sand filter. In order to explain the high efficiency of the latter in re-

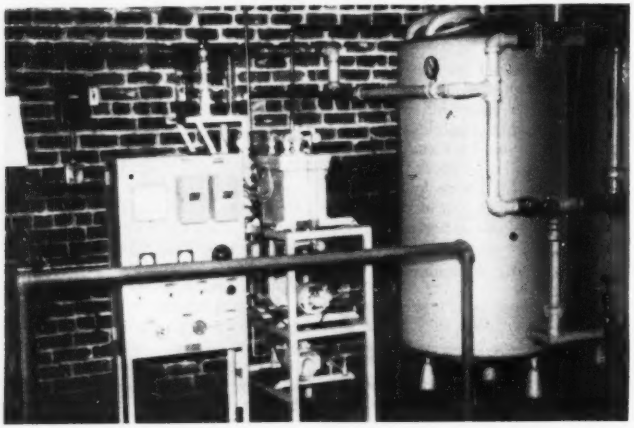


FIG. 3. Installation in beverage plant where ion exchange unit was not required.

moving microorganisms from surface water, the sand was considered to be coated with natural, biological growths of a gelatinous character, capable of adsorbing organic matter from water.

The activated rapid sand filter is to be contrasted with tight filters of porcelain or fritted glass. The latter have a pore diameter of only 0.0025 mm., and their action in producing a sterile liquid is based strictly upon mechanical retention. For the industrial filtration of water, these units are, of course, far too slow. The impregnated sand filter is, on the other hand, very fast, as well as effective, due to its openness and an action that is largely physical and chemical rather than mechanical.

The New Way

The fundamental considerations of electrochemical water treatment, discussed above, have been embodied in the new Electro-Chem equipment and method[1]. As shown in Fig. 1, the equipment is comprised of two principal parts. One part, providing for the generation of electrolytic aluminum hydroxide in conjunction with a sand filter, is directed to purifying the tap water of its organic contamination.

Object of the other part is to condition water for hardness or alkalinity, when required. It consists of an ion exchange pressure tank placed in line with the sand filter. The usual carbon filter (not shown in Fig. 1) is also part of the system.

Elements of the purifying equipment are a battery, a battery pump, and a feed pump. The battery pump recirculates liquid at high velocity during electrolytic generation, and feed pump delivers suspension to filter.

A solenoid valve, located on the filter pipe outlet, is in circuit with the feed pump, so that water drains from the sand filter to permit the aluminum hydroxide suspension to get into it at such time as the main water flow is shut off.

Fig. 2 shows the battery and pump mountings, also the electrical control box. The latter is provided with transformer, rectifier, ammeter, voltmeter, relays, switches, and other necessary electrical components, including thermal cut-out switches for battery and motors. It also has liquid level switches that control both drainage of the battery box by the feed pump and its re-filling with water.

In one preferred mode of operation, the electrolytic suspension is fed intermittently. Included is a feed before the plant starts up. Continuous electrolytic operation is used when required.

Program timers on the panel board of the control box schedule the intermittent operations of the battery, battery pump, and feed pump. Corresponding manual timers, situated at the bottom of the panel, may be substituted for the automatic units when odd operations are to be added, or regular ones curtailed temporarily.

A calibrated jar is included for filter sterilizing solution, which is utilized at the time of backwash. The solution may be hypochlorite or a quarternary ammonium composition.

TABLE—MATERIAL AND POWER COSTS of Electro-Chem Treatment for 10,000 Gal. of Water

Metal aluminum, 0.65 oz. @ $0.75/lb.	$0.031	
Power: Electrolytic, 0.3 kw. hr. @ $0.025	.008	
Pumping, 4.5 kw. hr. @ $0.025	.112	
Sterilization, 1 oz. @ $0.50/lb.	.030	
Total	$0.181	
With De-Alkalization, 3 gr./gal. $CaCO_3$		
Sulfuric Acid, 11.9 lb. @ $0.042/lb.	0.50	
Total		$0.68
With Softening, 7.5 gr./gal. $CaCO_3$		
Sodium Chloride, 41 lb. @ $0.016/lb.	0.50	
Total		$0.68

Performance of Unit

An installation of the unit in a soft drink plant is shown in Fig. 3. To the right of the battery and pumps are the sand and carbon filters. In this particular plant there was no need of dealkalization, so a third pressure tank for ion exchange is not included.

Operation of the equipment is automatic. Current flowing through the battery determines the rate of generation of aluminum hydroxide, and there is adjustment to a value determined by the rate of water flow and the degree of treatment required. Generally, the current is less than 3 amp. and voltage less than 10 v., averaging about 5 v. Rate of feed of aluminum hydroxide in relation to the total flow of tap water is usually less than 3 ppm.

Battery and feed pump are automatically cut off at a fixed time at the end of the day, and also on Sunday. The cut-off time may extend beyond that of the main water flow, in which case the drain solenoid valve provides for displacement of the water in the filters by the battery suspension.

Sterilization of the filters is generally carried out at the time of backwash, or less frequently. Regulation of concentration, rate, and time of feed, are controlled by valves and the feed pump manual time switch. The sterilizing operation insures final destruction and elimination of residual matter that has not been removed by ordinary back-washing. It places the filter in optimum condition for further functioning.

An outstanding result of employment of the Electro-Chem equipment has been the exceeding reduction in tap-water turbidity, which is not generally visible to the eye but is readily measured by instrumental light scattering. Treated water has frequently showed the same optical transparency as distilled water, and turbidity has consistently been less than 0.1 ppm. Tap water, on the other hand, ran as high as 5 ppm.

The sand filter, without the aluminum hydroxide activation, caused little or on reduction, particularly at the lower turbidities. Significance of the extreme reduction in the presence of aluminum hydroxide is that the adsorption process removes subdivided matter of the smallest colloidal dimensions, including particles of bacterial size.

As would be expected from this result, and the cited properties of aluminum hydroxide, microorganisms in the treated water have consistently been reduced to negligible values. In instances where the original tap water soon showed organic growth on standing, the treated water remained clear after protracted lengths of time.

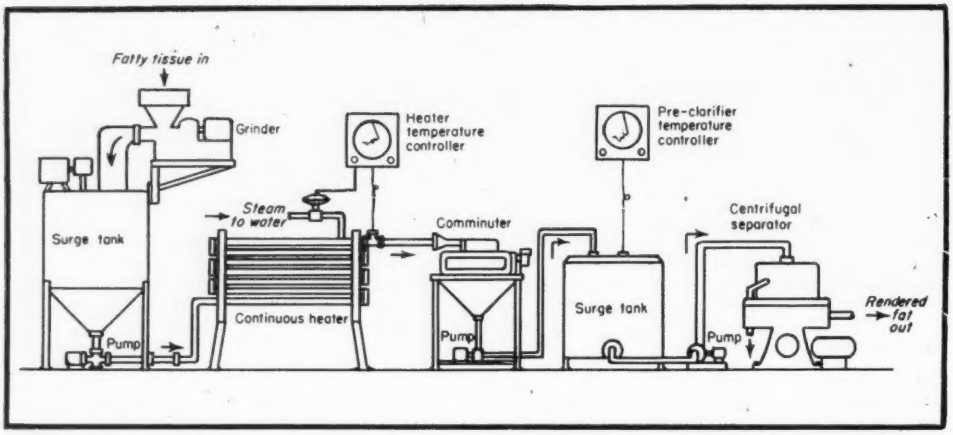
Color originally present in the tap water to the extent of 10 or more ppm. has been reduced to a negligible value. Likewise, mustiness, and phenolic taste and odor were reduced to non-detection. The carbon filter is an active agent for these purposes, and its efficiency is protected by prior aluminum hydroxide treatment of water.

As for the technicalities of operation, the small space required for the equipment is noteworthy, also the ease of control, absence of chemical corrosion, and freedom of any possible leakage (due to incomplete coagulation) of soluble chemicals into the finished water.

A breakdown of material and power costs for beverage plant treatment of tap water is given in the table accompanying this article. Material and power costs are based on small lot purchases. Electrolytic power refers to that required for the battery and feed

(Turn to page 178)

How Fat Is Now Rendered—Step-by-Step Flow



ENGINEERED INNOVATION, new Kingan process represents entirely different approach to fat rendering. It is not encumbered by traditional methods. This flow diagram shows how fat is ground, heated, finely comminuted, and centrifuged to separate the finished fat from solids material. See opposite page for striking new-old comparisons.

Kingan perfects continuous process that

Revolutionizes Fat Rendering

Totally new low-cost "flash" process gives higher yields and an upgraded product. Expected to abolish expensive refining and tank-water operations

R. E. MORSE, W. R. DAYEN, and K. M. CHRISTENSEN

Respectively, Research Director and Research Chemical Engineers, Kingan & Co., Indianapolis, Ind.

Animal fat products have seen improvement in recent years. But added manufacturing costs behind this quality upgrading still keep this phase of meat packing from justifiable profits.

Perhaps the toughest cost hurdle delaying an improved animal-fat economy is the process of rendering—that initial operation which liberates the fat from surrounding tissue. Accepted methods of rendering add a major chunk to product cost. Bulky, closely supervised equipment is involved and the raw material is often so mistreated that expensive refining operations must follow to salvage quality.

Thus, as a basic project in our current research and development program at Kingan & Co., we were determined to come up with an entirely new approach to rendering which would offer not only economy, but also a rendered product that would require less subsequent, costly refining.

Today—spurred by an urgent need to modernize failing equipment in our oleo-stock and lard departments—we now have a prototype commercial rendering system in operation which has already exceeded greatest expectations by replacing a typical—

- **4-step, 4-hr. batch rendering with a 15-sec. "flash" process.**
- **3,600 sq. ft. process area with a 200 sq. ft. equal-volume operation.**
- **Operating power cost of over $3 per ton with one of only 15¢ per ton.**
- **Discolored, odor-laden fat with a white, bland, highly stable product.**

Many other almost unbelievable claims could be added to the above, but it might be well to first basically describe our new development before taxing our readers' credulity.

In brief we have devised a continuous system for breaking down fatty tissue into fat, water, and solids that are subsequently separated by centrifuging. In the past many investigators have followed a similar approach only to produce an emulsion which resisted the centrifugal separation.

How It Evolved

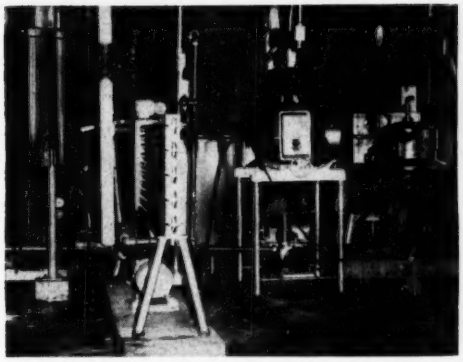
In our first formal conference on this project we went back to fundamentals. It was agreed that our problem simply involved a faster and more effective way of setting fat free from a proteinaceous cell wall.

Applied heat—the traditional batch way—while effective in rupturing tissue cells, was too slow.

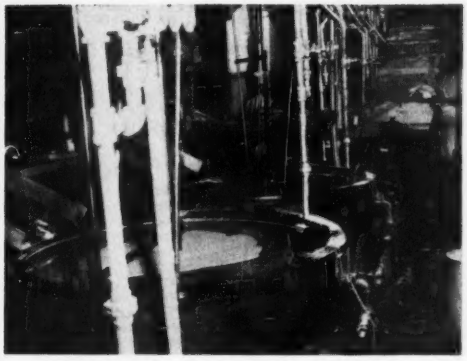
But why not reduce the fatty tissue by grinding to a fluid mass and then pump it through a continuous heat-exchanger to effect rapid heat-rupture? Fluid components could then be separated from the solid material by a continuous centrifuge.

Equipment was acquired to test this theory. But while rendering did truly

The Striking New Process ↓ . . vs . . ↓ Inefficient, Outmoded Way



COMPACT NEW rendering unit occupies only 1/18th as much floor space as conventional process. Left to right: Surge tank (with grinder on top), tubular heater, comminuted-fat surge tank, comminuter, and centrifuge.



OLD BATCH rendering kettles, part of outmoded process that requires great amount of floor space, 20 times as much power, 6 times as many man-hours for cleaning. Total time, old way: 175 min. New way: Only 15 sec.

Oleo-Stock Rendering Operations, 4,000 Lb./Hr.

New Continuous		Old Batch	
1. Grinding	*Continuous*	1. Hashing	15 Min.
2. Heating	*Continuous*	2. Melting	120 Min.
3. Comminuting	*Continuous*	3. Settling	30 Min.
4. Centrifuging	*Continuous*	4. Clarifying	60 Min.
Elapsed Process Time	*15 Sec.*	Total Process Time	175 Min.
Floor Area	*200 Sq. Ft.*	Floor Area	3,600 Sq. Ft.
Power Costs	*15c. Per Ton*	Power Costs	$3.00 Per Ton
Cleaning	*4 Man-Hours*	Cleaning	24 Man-Hours

Yield and Quality Compared (Production Rendering Run)

Beef ("Flash")

	Kill	Cut
Yield in Pounds (Per 1,000 lb.)	*910*	*910*
FAC** Color	*3*	*3*
Free Fatty Acids (Percent)	*0.18*	*0.20*
Water (Percent)	*0.10*	*0.10*
Swift Stability		
AOM*** (Hours)		
Without Antioxidant	*25*	*45*
With 0.015 Percent Sustane 3F	*400-Plus*	*350*

Pork ("Flash")

	Kill	Cut
Yields in Pounds (Per 1,000 Lb.)	*930*	*910*
FAC** Color	*1*	*1*
Free Fatty Acids (Percent)	*0.10*	*0.20*
Water (Percent)	*0.15*	*0.15*
Swift Stability		
AOM*** (Hours)		
Without Antioxidant	*14*	*10*
With 0.015 Percent Sustane 3F	*113*	*113*

Beef (Kettle)

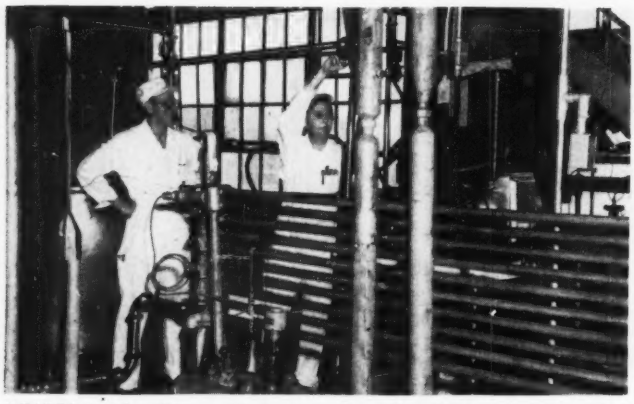
Yield in Pounds (Per 1,000 Lb.)	770*
FAC** Color	5
Free Fatty Acids (Percent)	0.36
Water (Percent)	0.25
Swift Stability,	
AOM*** (Hours)	
Without Antioxidant	4.5
With 0.015 Percent Sustane 3F	35

Pork (Prime Steam)

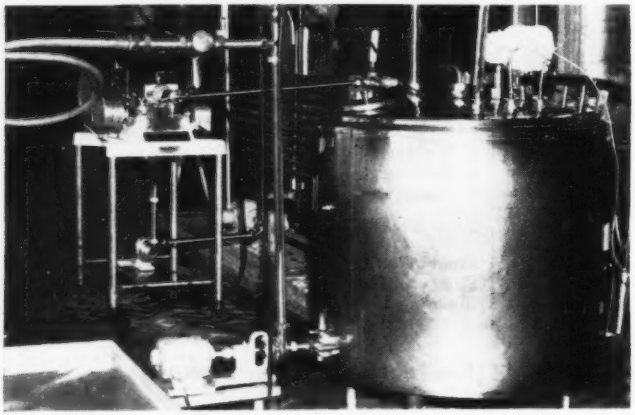
Yield in Pounds (Per 1,000 Lb.)	760****
FAC** Color	1
Free Fatty Acids (Percent)	0.25
Water (Percent)	0.50
Swift Stability,	
AOM*** (Hours)	
Without Antioxidant	7
With 0.015 Percent Sustane 3F	100

* 1951 Kingan yield.
** Fats Analysis Committee (of American Oil Chemists Society).
*** Active oxygen method.
**** 1951 Kingan yield all plants.

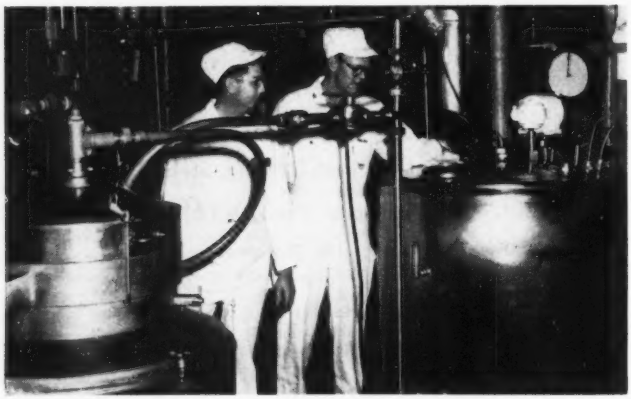
Closeups of Units in Revolutionary Process



HEATER is of multi-pass tubular type, has automatic temperature control. Co-authors Christensen (left) and Dayen are operating process.



COMMINUTER (seen left) reduces heated fat particles to sub-cell or micron sizes. Then fat is pumped to surge tank (right).



CENTRIFUGE (left) takes comminuted fat from surge tank (right) and separates liquid from solids. Result: Low-cost, high-quality, long-keeping fat.

occur by pipeline heating, yields were poor, and it was almost impossible to get efficient centrifuging of the dense fatty mixture.

It seemed obvious that much more size reduction of fatty tissue was initially necessary, and several grinding steps were then employed prior to the heat-exchanger. But power costs of this operation turned out to be prohibitive, and the centrifuge trouble still was with us.

At this point mechanical (rather than heat) disintegration was emphasized. It was reasoned that the large power costs and centrifuge setbacks were due to the inherently high viscosity of the material.

Why not employ an initial low-cost grind, then continuously heat to achieve fluidity and protein coagulation, and follow this with a low-power-consuming comminuting treatment which would mechanically accomplish the needed cell wall rupture?

As reasoned, the fine comminution of a heated fat-protein slurry permitted easily controlled subsequent separation by centrifuge.

The Working Process

In setting up a small commercial process based on laboratory findings, decision was to locate it in the beef-fat department adjacent to the large oleostock melting tanks and clarifying kettles. This offered a good supply of fat when needed. Further, it would permit the system to supplant one of the most costly and messy operations in the plant.

Initial reduction of the large pieces of both hot and cold fat to a particle size of about ¼ in. was achieved by using a standard meat grinder with a special knife and plate. But conventional pumps would not move this material. It was found that a progressing-cavity type positive displacement pump was necessary for the job.

It was found that the continuous heating of the fluid fatty tissue could be accomplished in a multi-pass tubular heater of the type used to preheat milk in dairy plants. In such heat exchangers, the fat passes through the inner tube while temperature-controlled hot water is circulated through the concentric outer tube.

For final size reduction, a commercially available comminuter was selected and specially modified for the application, with the good help of the equipment firm representative. We thus got comminution to sub-cell or micron sizes, and the power requirements of this unit have proved very reasonable.

Several types of centrifugal clarifica-

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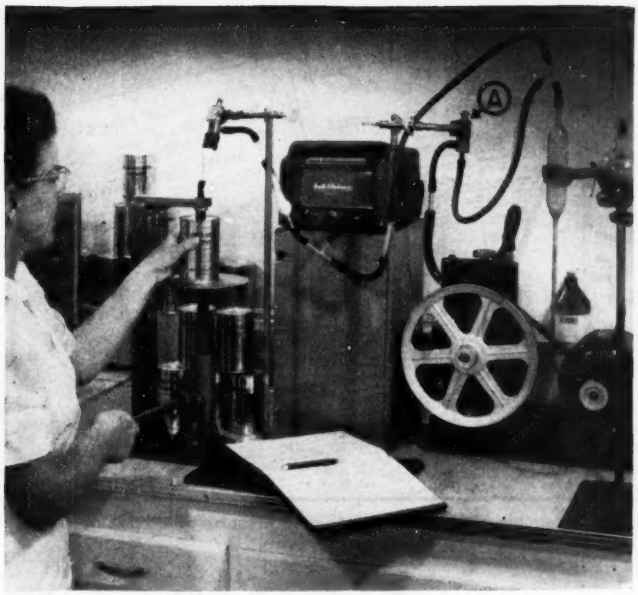
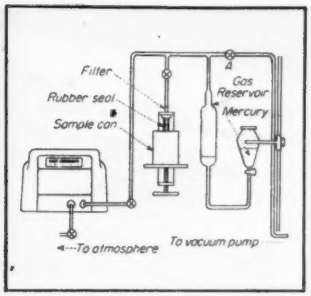
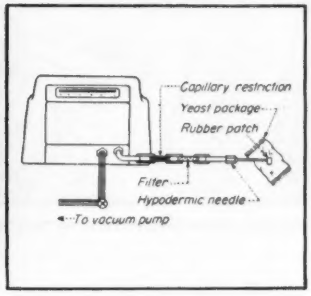






CAN is positioned on hydraulic jack platform (left) so that rubber tube makes air-tight seal with lid. Then valve (A) to vacuum pump line is opened, the system evacuated and the valve closed. Can lid is punctured by raising jack. This permits gas to flow to analyzer. Percent oxygen is read directly. Right: Schematic of can testing apparatus (top), and the method employed for checking the film packages (above).

1-Min. Test for Package O_2

Powdered lemon juice maker maintains continuous control over packing system by giving filled cans 1-min. check. Apparatus applicable to film packages, too

C. C. TAYLOR and S. C. D'ANFORTH

Respectively, Mutual Citrus Products Co., Anaheim, and Arnold O. Beckman Inc., S. Pasadena, Calif.

Deleterious effects of oxygen on many canned and packaged foods have brought about marked improvements in the methods of handling and packaging these products.

Take the case of Mutual Citrus Products Co., Anaheim, Calif., when it discovered the possibilities of preventing off-flavor and odor development in it's canned powdered lemon concentrate by reducing the oxygen content to 0.5 percent. Mutual immediately adopted advanced packaging techniques.

By replacing atmospheric oxygen with carbon dioxide, oxidation of the unsaturated terpenes and sesquiterpenes present in the lemon oil is prevented. As a result, flavor and quality of the powdered juice are preserved almost indefinitely.

To insure this low oxygen content in every package, Mutual set up a regular checking system by which the atmosphere of one can from each evacuator chamber is tested.

Processing Steps Detailed

In the production of the powdered lemon juice, concentrated juice is sprayed under high pressure into large bins where it is met by a blast of hot, dry air. The powder thus produced is collected in barrels at the bottom of the bins and sent to machines where it is packed in cans. Filled cans then pass through an initial sealing operation where lids are loosely fastened on. This merely prepares the lid for final sealing, but allows free passage of gas into or out of the can.

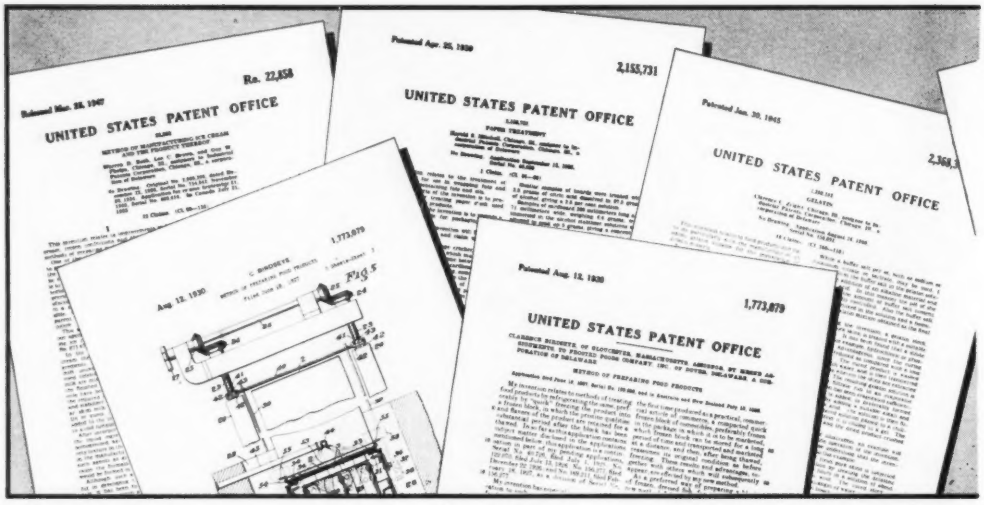
After the cans have been sealed in this manner, they are placed in a large (500 can) chamber. The cover is lowered into position and the chamber evacuated. Then carbon dioxide is passed through the bottom of the chamber and allowed to fill the void. Again the chamber is evacuated and refilled with carbon dioxide. Repeating the process practically assures complete replacement of atmospheric oxygen with carbon dioxide.

The chamber is then opened, and the cans are removed and sealed immediately. Carbon dioxide is preferred over nitrogen, for it is heavier and does not diffuse out of the can as quickly.

Checked Regularly

To check the efficiency of the gassing operation, a single can is selected at random from each batch and tested for oxygen content. An Arnold O. Beckman Model C oxygen

(Turn to page 213)



SAMPLE FOOD INDUSTRY PATENTS. Left panel: Improving ice cream, treating wrapping paper, making gelatin, and

Just What Is

JAMES M. MASON
Attorney at Law, New York City

First off, don't discount the simple—for valuable, "easy does it" food ideas are constantly winning the "coveted numbers" from Washington . . . But you do have to prove that your item or device is truly a fresh concept—either wholly new or varying the old idea to stand on its own

The fact is that many a food processing advance is fallaciously considered to be "only laboratory technique or kitchen chemistry," and thus impossible to protect.

But in truth, these ideas have often proved to be inventions of the highest order. Moreover, mere simplicity has not negated the presence of invention.

A familiar example is found in the advent of the frozen food field, which evolved in the mid-'30's from the discovery that quick frozen foods generally retained their nutritional values and vitamin contents substantially intact. Basic steps in the procedure—relatively simple manipulations, but nevertheless essential—were the subject of process patents.

Among these may be mentioned Clarence Birdseye's Patent No. 1,773,079, which covers a method of packaging and preserving food. It consists in packing the food in a container and freezing the same under pressure applied to substantial surface areas of the package. Freezing under pressure generally was not new, but novel effects resulted when he treated products in this manner.

Another patented process related to the simple manipulation of freezing a packaged food product while supported upon a plain surface and while the walls of the carton were enclosed within an open frame.

A further patent was issued to Birdseye on the method of preparing a marketable package of spinach by partially cooking the raw product, to remove a portion of its moisture and partly break down the cellular structure, then filling the spinach into a carton, and finally quick freezing from opposite sides of the container to convert the spinach into a solid block and further break down its cellular structure.

Although the manipulations were quite simple, they had far reaching effects upon the keeping qualities and nutritional characteristics of the preserved food product.

Applied to Meats

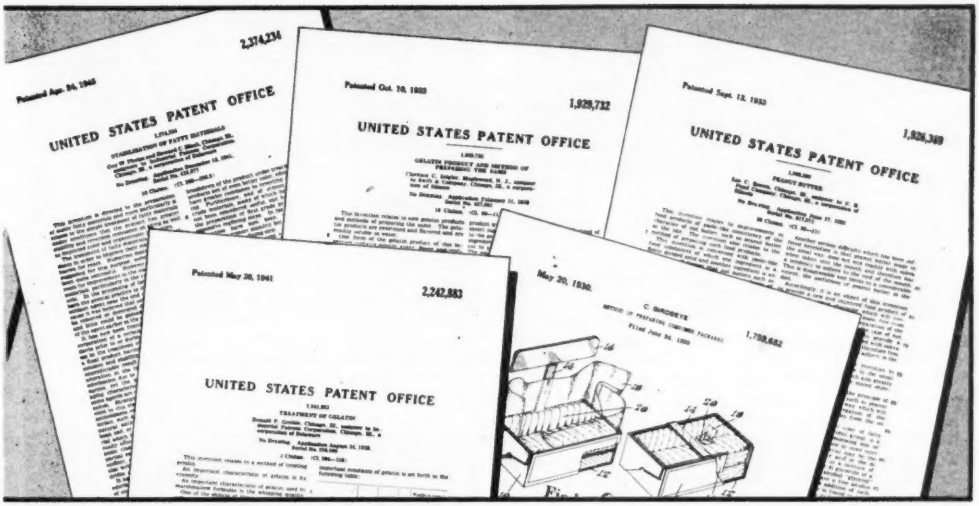
Various patents have been issued on relatively simple expedients in the treatment of meat and meat products. When preparing such foods for freezer storage, it was proposed to form an ice glaze on their surfaces and then cover the glaze with a resistant, impervious wax coating before the meat was frozen. This development was the subject of No. 2,337,645. It substantially improved appearance and flavor characteristics of the frozen meat.

Another simple expedient related to the preparation of a novel product by slicing meat into relatively thin portions, stretching the slices, and then consolidating and compressing them into a solid mass (No. 2,398,636).

And a process for the preparation of a winterized salad oil included the addition of a minor proportion of lecithin to a refined vegetable oil prior to the chilling stage (No. 2,393,744).

Developments in Packaging

Packaging of food products has been the subject of considerable attention, and various methods have been devised for treating the materials to improve keeping qualities of the food. In bakery products such as



preparing frozen foods. Right panel: Stabilizing fats, improving peanut butter, new gelatin product, frozen food package.

Patentable?

cakes and crackers, it was found that the cardboard or other wrapper became impregnated with shortening, which quickly went rancid due to the action of certain constituents of the packaging material. It was proposed to eliminate this condition by incorporating a small quantity of citric acid into the paper stock during manufacture (No. 2,155,731).

Another method for similar stabilization of wrappers involved incorporation of phosphoric acid in the paper. A later method of inhibiting rancidity is by lining the wrappers with wax coatings containing phosphoric acid.

Critical Conditions

A vast number of developments in food processing are based on discovery of critical conditions of treatment which result in unexpected and novel effects in the finished product. In this connection the general method may have been long known and recognized, but the discovery of critical temperature ranges, or other conditions, within the broad limitations of the prior art, yielded patentable novel effects.

This was true in the method covered by No. 2,381,761, which involved concentrating a milk product containing added sugar, by heating at a temperature above 100 deg. F. under partial vacuum, and cooling by evaporation to a temperature of between 70 and 95 deg. F. while severely agitating the milk. These temperature limitations were regarded as producing unforeseeable advantages and improvements in the finished product.

A further example of the "existence of discovery" in critical conditions is found in No. 2,251,496, covering a method of treating curd in cheese production by subjecting matted or cheddared curd, in the absence of salt, to a temperature of 50-60 deg. F. until a creamy texture is developed. In fact, the limitation of patented claims to the temperature range indicated is immaterial if the result does not obtain outside of the range.

If it were possible for anyone to predict that the expedient in question would result in the desired improvement, then an invention does not exist. Such a variation is said to be within the expected skill or technique of those versed in the art.

On the other hand, it is recognized that most research is premised on planned action directed toward improvement in the process of product. And ordinarily a new expedient is tried with at least a degree of expectation that it may be successful. When the expedient is proven operative by experiment, a discovery may result creating an invention.

In certain cases, additives known to have antioxidant, mold preventing, or other properties in related uses, may exert these same effects when added to certain foods. This new use constitutes an invention on the basis that the effectiveness of the additive in the particular food could not be prophesied.

Additives May Qualify

This situation was considered to justify issuance of a series of patents on the use of mono- and diglycerides —as in peanut butter (No. 1,926,369), ice cream (Reissue No. 22,858), egg materials (No. 2,182,209), and other food products.

The problem presented with respect to peanut butter was separation of solids from oil tending to cause the gummy composition to stick to the roof of the mouth. Addition of partial glycerides maintained the dispersion of solids in oil and greatly reduced the gumminess.

An entirely different result was obtained when partial glycerides were incorporated in ice cream. The improvement was observed in texture, overrun, and other properties special to the product.

In the case of egg material, addition of the emulsifier greatly improved baking characteristics of resultant cakes, bread, and other bakery products. Final results were entirely different from those obtained with peanut butter and ice cream.

Where an additive imparts distinctive improvements to the finished

product which cannot be accurately predicted from the existing knowledge of the additive, it is not essential to show that the effect is superior to that produced by similar additives of the prior art.

Actually, mono- and diglycerides are inherently present in small amounts in triglyceride oils and thus are introduced into food products in the normal utilization of vegetable and animal fats. The improved properties arose, however, from use of substantially greater amounts of partial glycerides than were naturally present in the fatty oils.

When It Is Added

There are numerous cases where incorporation of an additive during a phase of processing produces unusual results in the final product and constitutes an inventive process despite the previous uses of the additive in the product. In such instances, the exact point or method of incorporation constitutes the critical feature from which some new advantage or effect is realized.

In one method, reversion resistance of fatty materials such as lard was improved by incorporating therein, prior to or during deodorization, small amounts of an antioxidant material such as gum guaiac. In another process, fatty materials are stabilized against reversion by steam deodorization in the presence of refined soya bean or sesame oil which has been hydrogenated (No. 2,357,543).

Another expedient of this general type involved the reconstitution of dried egg material by adding water and a surface active agent such as sodium lauryl sulphate and thereafter whipping the mixture.

Demand for quick setting gelatin desserts stimulated development of a number of methods where additives were incorporated at critical points in processing, resulting in improved jelling properties.

In one process, a buffer salt was incorporated just before final filtration, resulting in a clear, concentrated solution of gelatin with rapid setting characteristics (No. 2,368,393). A further method involved making finely divided gelatin products in discreet non-adhering particles by mixing a volatile refrigerant such as solid carbon dioxide directly with the gelatin and then grinding the product (No. 2,392,297).

Known for Other Uses

A case of creating a new process by use of a material previously employed for the same purpose in other products is illustrated in the coating of cheese with a waxy material containing a higher fatty acid and propionic acid in order to retard mold growth.

Patents had been issued covering methods of preventing mold growth in bakery products by incorporating propionic acid. And an anti-fungal preparation that included sodium porpionate was the subject of other patents. The distinguishing feature is in the discovered effectiveness of the propionic acid in the wax base normally associated with bulk cheese.

In the poultry field, eggs are whitened by subjecting the shells to the action of a reducing agent such as sodium hyposulfite (No. 2,342,345), and by treatment with a peptizing agent such as thiosulphate. A method was devised for masking unattractive chicken heads by dipping them in a solidifiable wax preparation, whereby the birds are rendered more eye-appealing.

Meat Tenderizing

Processes have been developed for tenderizing meats using fruit juices and other materials containing enzyme active substances. Enzymes had previously been used in the treatment of meat, but in the new processes conditions were so controlled that the enzymatic action was checked before disintegration of the fiber.

In one method, meat tissue was subjected to action of a proteolytic enzyme for a time sufficient to allow a substantial tenderization, then the enzyme action was arrested to prevent further disintegration of the tissue (No. 2,321,621 to No. 2,321,625).

The widely used "Tenderay" process has been the subject of continued investigation and improvement. The basic process constituted treatment of meat at a relatively low temperature (approximately 55 deg. F.) to stimulate enzymatic action to a point of desirable meat tenderness without spoilage, while simultaneously inhibiting surface spoilage by ultra-violet light (No. 2,169,081).

Meat may be preconditioned for this treatment by subjecting the carcass to an electrical current promptly after slaughtering, effecting release of the latent energy from the muscular tissue (No. 2,544,681).

A further refinement of the Tenderay process consists of cooling the freshly slaughtered meat, during a period of about 24 hr., to an internal temperature of about 54-59 deg. F. Then it is treated at a particular relative humidity while exposed to ultraviolet radiation to inhibit the growth of bacteria and mold. Finally, the meat is chilled to between 36 to 40 deg. F. for preservation.

This latter method demonstrates the importance of critical conditions, and patent claims may be allowable covering a range of temperatures within which a certain effect is achieved in a given time period.

Initial Steps for Your Patent

A prerequisite to preparing a patent application is an evaluation of the expedient in the light of prior knowledge concerning the general subject involved. If the step is novel and one not immediately obvious, the chances are that it can win patent protection. An attorney skilled in such matters is usually of substantial help in advising as to the likelihood of securing patents.

The application itself consists of a description of the method in general terms, followed by a detailed step-by-step relation of the process and, preferably, including specific examples containing temperature conditions and all critical requirements necessary for the successful execution of the process. This description is then followed by claims which distinctly set forth the gist of the invention.

It must be pointed out that initial action by the Patent Office may be a rejection, since examiners are known to be stringent regarding inclusion in the record of the precise features characterizing the invention and distinguishing it from related methods.

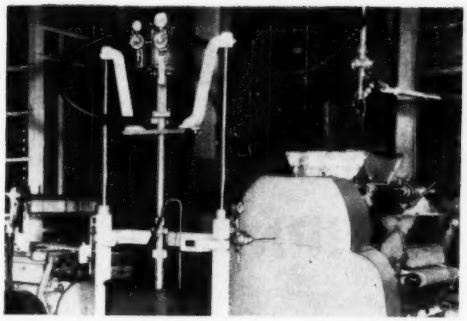
In any event, it is generally inadvisable to attempt to maintain secrecy of a novel development, in lieu of obtaining patent coverage—for the device will inevitably become known to others through analysis or disclosure.

The limited monopoly of 17 yr. patent coverage which is cumulative with the 2-3 yr. the application is pending, usually provides an entirely adequate period for protection. Generally, before the end of the statutory period the development is superceded by improvements.

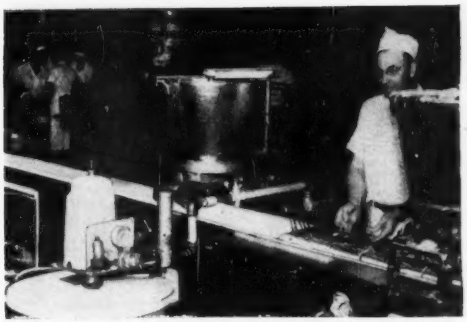
The standards usually observed in determining the presence or absence of invention in chemical processing are generally inapplicable in the food industry. This is largely due to the inexact organic constitution of most foods, which makes prediction as to the result obtained by chemical incorporation practically impossible.

The same is true with respect to conditions of treatment, and this has formed the basis for many patents concerning variations in existing methods within critical limits.

In general, the development of a meritorious advance may be rewarded by the grant of a limited monopoly—provided the expedient is novel and has the quality of producing a new advantageous result.

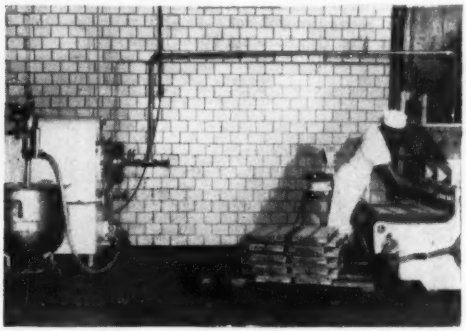


JAM and shell dough is automatically fed to hoppers of fig-newton extrusion machine. New sanitary pump sucks fig jam (2,500 lb./hr.) from drum. Another (not shown) handles the dough. (Sawyer Biscuit Co., Chicago)



FIRM-SET JELLY is continuously pumped from drum to spreader bar, which then deposits it, free flowing, onto jelly rolls. Pumping is under 20-30 psi. (Jersey Farm Baking Co. of Chicago)

FROSTING, pumped from mixing bowl to spreader, is deposited on cakes for decorating purposes. Number of ribbons of frosting can be varied to suit type of cake. (Petersen Bakeries, Omaha, Neb.)



ANY OF FOUR types of cake batters are pumped through mixer to depositor. Pump, line, and mixer are easily cleaned by forcing hot water through system. (Jersey Farm Baking Co. of Chicago)

Pumping Licks *More* Problems

Bakers now use versatile "mover" for jam, jelly, frosting, and batters . . . and in new spraying, extruding, and lubing operations, too

FE STAFF

As might be expected, a pump that abolishes hand scooping of cookie dough from trough to depositor hopper (FE Sept., p. 83) will efficiently perform many other tasks in the food processing plant.

And it is.

For the sanitary piston pump adapted by Salerno-Megowen is now simplifying seven other operations in different plants—

1. **Feeding cake batters through mixer to depositor.**
2. **Extruding jelly onto belt-conveyed cakes.**
3. **Spray-coating cup cakes with jelly.**
4. **Pumping jam and shell dough to fig-newton extruder.**
5. **Decorating cakes on conveyor line.**
6. **Applying jelly on sweet goods.**
7. **Lubricating oven chains.**

A double-action model of the pump is employed at Jersey Farm Baking Co. of Chicago for feeding any of four different cake batters—spice, sponge, devils food, and angel food—from a 240-qt. bowl directly through a continuous mixer to a depositor.

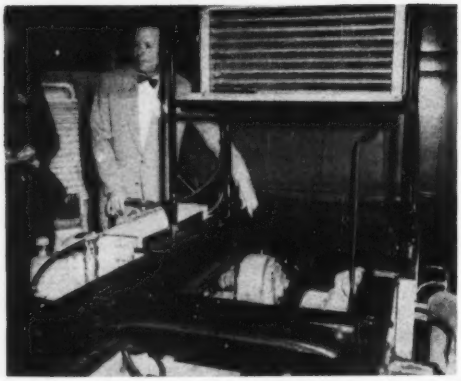
Ingredients are pre-blended 3½ to 4 min. in a vertical batch mixer. Next, the bowl is wheeled to the pump, which is then raised on a counter-balanced line. The bowl now slides into position and the pump is lowered. Then, by a simple pressure adjustment on the pump, flow of batter is controlled through the continuous mixer and, at the same time, the amount of material in the depositor hopper is kept at a minimum.

Simplicity and sanitation are stressed by the bakery's management. With this new arrangement, four handling and cleaning operations are eliminated. Also "out" is the old need for a holding tank. At the end of a run, the pump is easily cleaned by

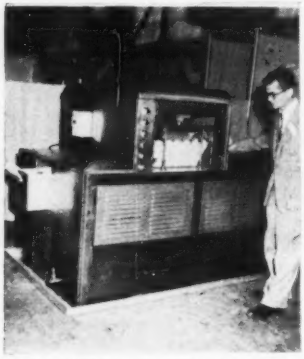
(Turn to page 147)

DAIRYMEN VIEW LATEST EQUIPMENT

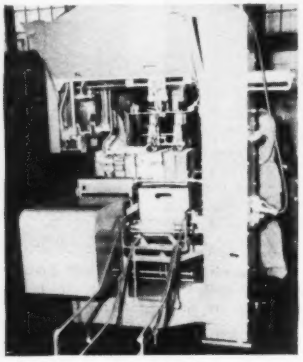
Automatic operation, savings in labor, improved sanitation featured in machines displayed at Dairy Industry Exposition. Small-plant units accented



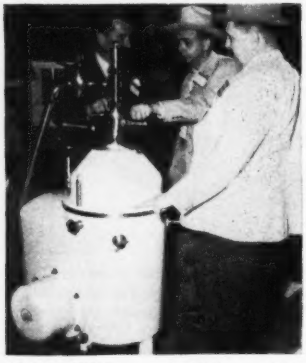
TRUCK refrigeration system derives power from crankshaft, propeller shaft, live axle, or power takeoff by means of hydraulically operated multiple-disk clutch. Thermostats (in body) control solenoid that operates clutch—Kold-Hold Mfg. Co., Lansing, Mich. (80A)



AUTOMATIC packer handles filled bottles at up to 180/min. Operates by hydraulic system without gears—Cesco Container Co., N.Y.C. (80B)



CASER for paper bottles automatically assembles, packs Sealking quarts 160/min. Handles other sizes—Sealright Co., Fulton, N. Y. (80C)



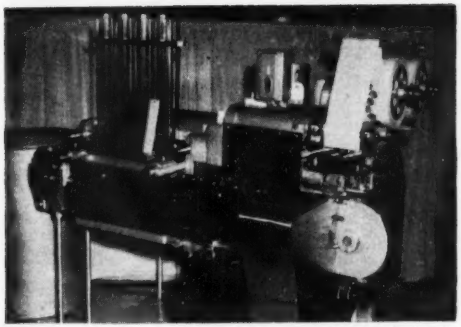
CLARIFYING, standardizing within 0.05 percent, and separating are just one operation with this unit.—Sharples Corp., Philadelphia. (80D)

SQUARE container holds 3½ gal. of ice cream, permits 40 percent increase in cabinet capacity, 20 percent in hardening rooms and trucks. Made of special corrugated paperboard with wax-treated, bleached kraft liner—Marathon Corp., Menasha, Wis. (80E)

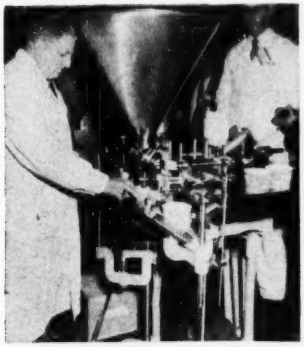
MILK CANS are filled uniformly without spillage or foaming by unit that employs air pressure to raise can and open valve in supply tank. Fills 5, 8, and 10 gal. sizes to predetermined neck level—Norris Dispensers, Inc., Minneapolis. (80F)

Specially Designed Wrapping, Filling Machines

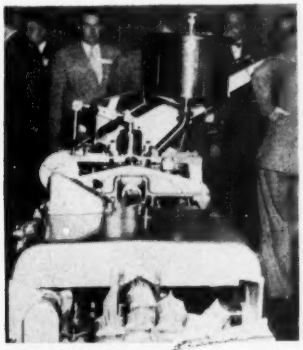
STICK NOVELTIES are automatically bagged and the bags heat sealed at rate of 900 doz./hr. by this Vitaseal machine displayed by Joe Lowe Corp., New York City. (81A)



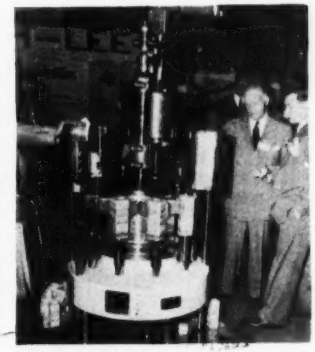
ICE cream is sliced and wrapped on 6 sides at 200/min. by Turner cut-wrap machine. Also wraps and heat seals anything from candy bar to loaf of bread—Anderson Bros. Co., Rockford, Ill. (81B)



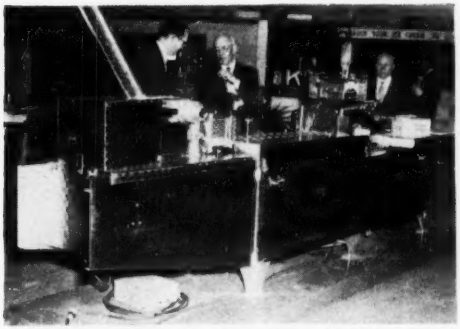
FILLER-CAPPER dispenses, fills 12-oz. containers with cottage cheese, then applies preformed aluminum lids 40-45/min. Handles 71 mm. tumblers, too. —The Econ-O-Seal Co., Indianapolis. (81C)



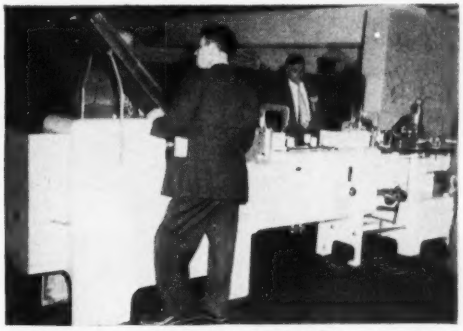
PURE-PAK filler-sealer for medium and small dairies uses nested type, fabricated, paraffined, printed bottles. Handles 20 qts., pts., ½-pts./min.—Illinois Creamery Supply Co., Chicago (81D)



AUTOMATIC filler, for small or medium size plants, opens, fills, seals up to 15 Canco qts./min. Smaller sizes faster. Size changes for pts., ½ pts. made in less than 2 min.—Smith-Lee Co., Inc., Oneida, N. Y. (81E)



BUTTER patty machine with print extruder that automatically adjusts itself to speed (1,200 lb./hr.) at which pats are formed. Wraps, stacks, ejects 5 slabs at once—C. Doering & Son, Inc., Chicago. (81F)



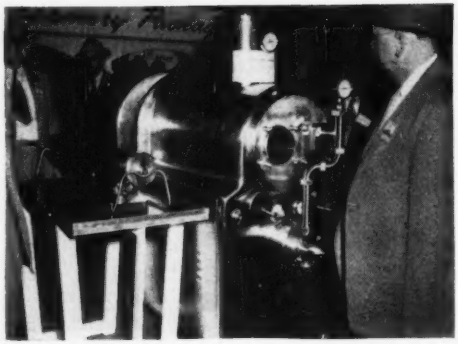
BULK butter is automatically converted to completely wrapped layers of pats at speed of 1,600-2,400 lb./hr. in unit displayed by Chiplets Inc., New York City. Sold outright or leased on 8-yr. plan. (81G)

Want more information about any items in this picture article? Just circle key number (in parentheses at end of each caption) on the Reader Service coupon adjacent to the inside back cover.

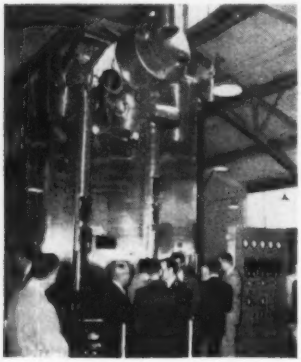
Turn Page for More New Units→

Processing Units for Numerous Dairy Products

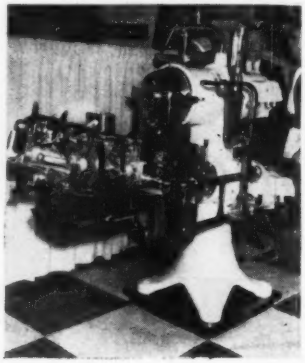
CONTINUOUS curd concentrator produces bakers' cheese of desired solids by centrifugally removing part of whey—The De Laval Separator Co., Poughkeepsie, N. Y. (82A)



HEATER-CHILLER for heavy products employs ammonia to cool foods. Or steam or hot water for high temperature heating—The Creamery Package Mfg. Co., Chicago. (82B)



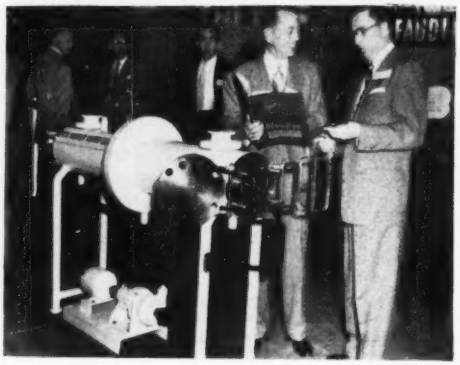
EVAPORATOR featuring new design, performance, and automatic control displayed by Buflovak Div., of Blaw-Knox Co., Buffalo. Unit type construction combines compactness with complete accessibility. (82C)



CONTINUOUS butter making machine with capacity of 2,200 lb./hr. employs high-speed beater to churn cream. Then it presses-off buttermilk, works butter in several stages.—Centrico Inc., New York City. (82D)

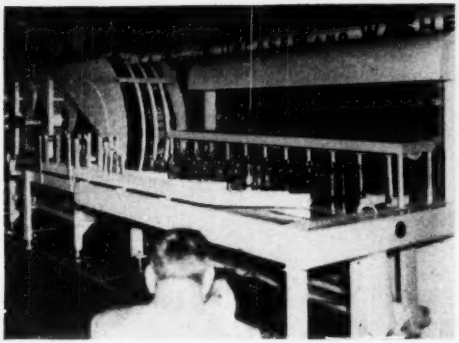
STAINLESS steel churn with transparent plastic door having patented locking device. Has quick-empty truck. Made in 1,200, 1,600, 2,000 lb. sizes. Displayed by The J. A. Gosselin Co. Ltd., Drummondville, Quebec. (82E)

VACUUMIZER removes air and volatile gases from milk during processing. Installed between regenerator and heater sections of HTST pasteurizer. Maker: Chester-Jensen Co., Chester, Pa. (82F)

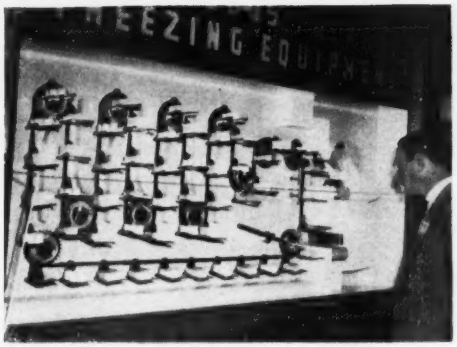


SHELL and tube heater and cooler uses steam, hot water, sweet water, direct expansion Freon, or ammonia. Has hinged, gasketed stainless steel heads for quick cleaning. —The Pfaudler Co., Rochester. (82G)

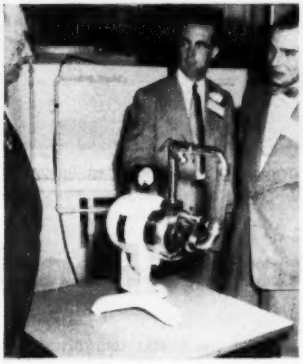
Materials Handling and Controlling Devices



UNCASER and washer-loader removes milk bottles from cases and cartons by inverting them, then sets them right side up on conveyor that feeds washer at speeds up to 24 cases/min.—Radio Corp. of America, Camden, N. J. (83A)



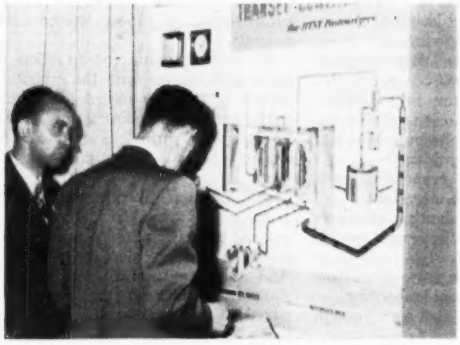
DEMONSTRATION model of Votator continuous package freezing unit was displayed by The Girdler Corp., Votator Div., Louisville. Equipment handles ice cream in packages from 1 pt. to ½ gal. Will harden up to 450 gal./hr. (83B)



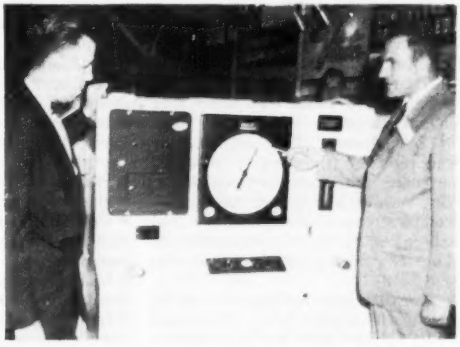
CONSTANT VOLUME pump employs two independent impeller vanes that fan out for maximum volume, contract when head drops—Girton Mfg. Co., Millville, Pa. (83C)

HOMOGENIZER equipped with special ball valve cylinders to give minimum maintenance, maximum efficiency with viscous products—Manton Gaulin Mfg. Co., Everett, Mass. (83D)

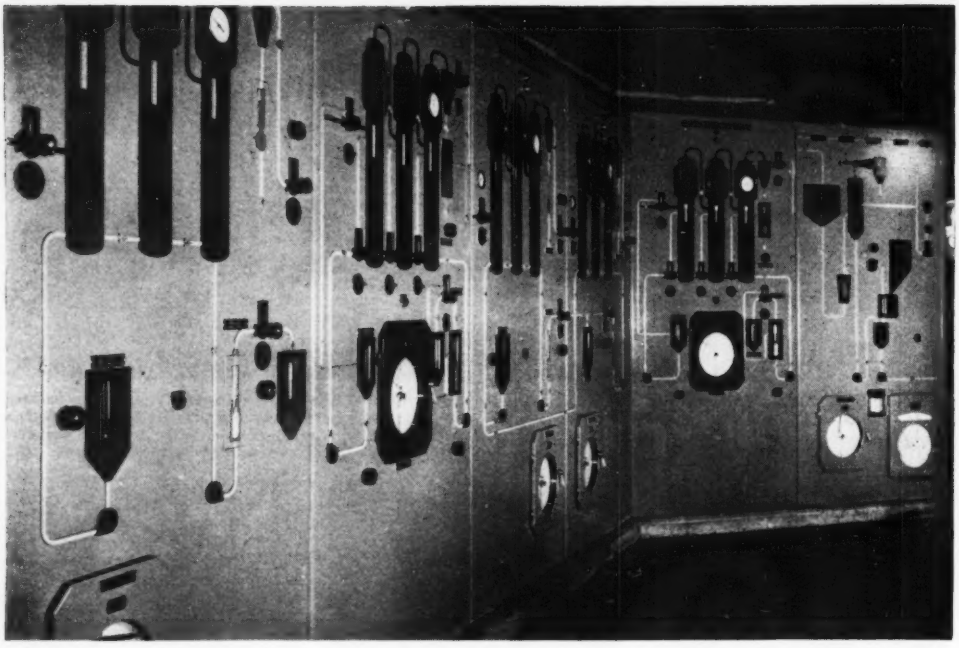
FILLED bottles are cased by one man at up to 180/min. using economical Mapes unit. Employs special 6-bottle gripper—Cherry-Burrell Corp., Chicago. (83E)



MINIATURE indicator and recorder (seen at upper left) for remotely controlling HTST system were displayed graphically by Taylor Instrument Cos., Rochester, N. Y. Installed outside of pasteurizing area, units are said to simplify remote operation of process. (83F)



MOBILE, sanitary instrument control panel forms heart of Robichaux continuous cream neutralizing system which employs pH determining and adjusting equipment. Panel and units displayed by Minneapolis-Honeywell Regulator Co., Brown Instruments Div., Philadelphia. (83G)



FIVE SETS of multiple-effect evaporators and a system for controlling dry chemical feed to converted liquor (far right) are graphically detailed on these panels—all under the eyes of one operator.

Revolutionary Graphic Panel

Flow-diagram arrangement of instruments and valves enables unskilled operator to grasp the complex process. Improves control precision, cuts down-time

LLOYD E. SLATER
Assistant Editor, "Food Engineering"

Continuous processing—despite parallel success elsewhere—still is "very much in the future" to many food manufacturers.

"We'll admit," they say, "that we can probably triple our efficiency by installing continuous-flow equipment. But such operations are much more complex than what we do now. And where will we find the technicians to keep new high-powered processes on the beam?"

Corn Products Refining Co.—facing this situation often in its development of an outstanding wet-milling system—has adopted a revolutionary new approach to process supervision. This system may, in time, catalyze many cautious batch processors into continuous action.

Called "graphic panel" control, it employs a silhouetted layout of the actual process—plus superimposed working miniatures of its instrumentation—on a central supervisory panel. Initially installed to run five multiple-effect evaporators in the Pekin refinery, the new technique solved a knotty supervisory problem by:

- **Placing all five evaporating sets under the care of one attendant.**
- **Upgrading attendant's efficiency through a "visual" approach to his process.**
- **Minimizing evaporator down-time due to simplified trouble-shooting.**
- **Improving process economy through closer operating tolerances.**

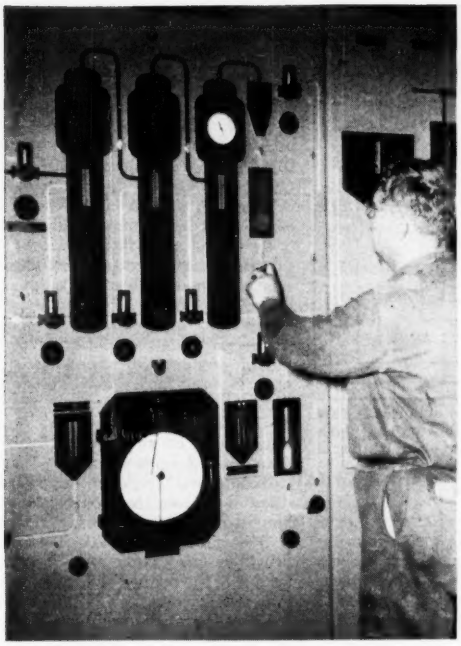
One of the first problems in the design of such a graphic panel was the need for compact miniature instruments to fit space limitations.

To achieve space economy, a system of pneumatic transmission was employed. This places as much instrumentation as possible directly at the process rather than on the panel. Air signals from plant units to the control board furnish measuring indications. And separate air lines running from the panel permit remote setting of control-points of process-located components.

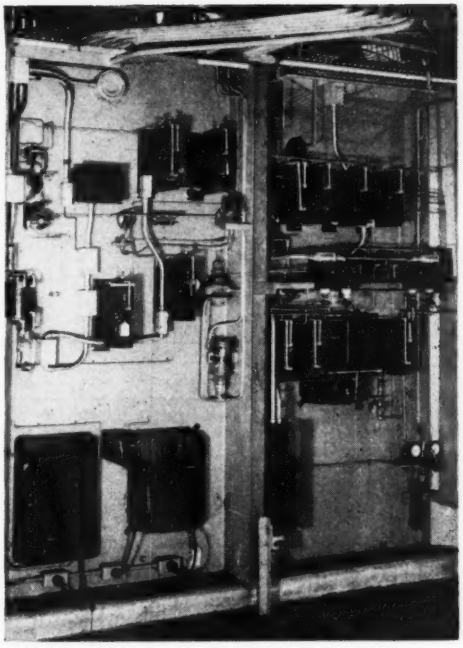
By so simplifying the function of panel instruments—with the exception of one or two key recorders—to indication and control-point setting, it was possible to "shrink" a bulky 30-ft. control station into a compact 10-footer.

Other visual advantages appeared as the graphic panel took shape. Product and processing fluid pipelines were given identifying colors on the panel. And the very useful innovation of showing control-valve position was also added, these color-coded indicators being equipped with knobs for remote manual valve positioning.

Final result of some highly ingenious design and engineering—by Corn Products, in cooperation with Panellit, Inc.—is a new form of process control



SILHOUETTES picture evaporating process. Operator adjusts temperature of condenser water.



BEHIND-PANEL parts do not concern supervisor—engineer services them.

Simplifies Process Control

and supervisory panel in the food industry.

With a graphic panel before him, an operator can watch the rise and fall of product in huge vessels, the speed of flow through scattered pipelines, the gradient of temperatures along a 50 ft. column. And it introduces a distinct new "feel" for the process to the supervisor. He now can see the forest as well as the trees.

Evaporators a Good Test

Early in 1950, a triple-effect corn-syrup evaporator was placed under the guidance of a single graphic panel about 8 ft. high and 4 ft. wide. After only one year, similar panels were set up for the four other evaporating sets—two on dextrose and two on industrial sugars.

Only one attendant now is required to keep all evaporators balanced. Yet control has been upgraded to where it is consistently ±0.2 deg. And there has been a definite decrease in costly down-time due to preventable process failures. This is attributed to an increased interest and process know-how developed by the company's personnel.

Recently, still another graphic component was added to flank the evaporator control station. This is a panel for controlling dry chemical feed to partially converted liquor.

An Operator's View

An operator's "eye-view" of the graphic panel layout for a triple-effect evaporator discloses black silhouettes of the three evaporating bodies, with their water and vapor flow to the barometric condenser. Also in black are the liquor supply and discharge product tanks, with yellow panel piping indicating product flow through the system.

Superimposed vertically on all the liquor-bearing vessels are small indicating liquid-level gages which are marked off in percent level. These are actually small pressure gages, actuated from remote level transmitter, which are rigged up to move a color screen up and down behind a calibrated indicating dial.

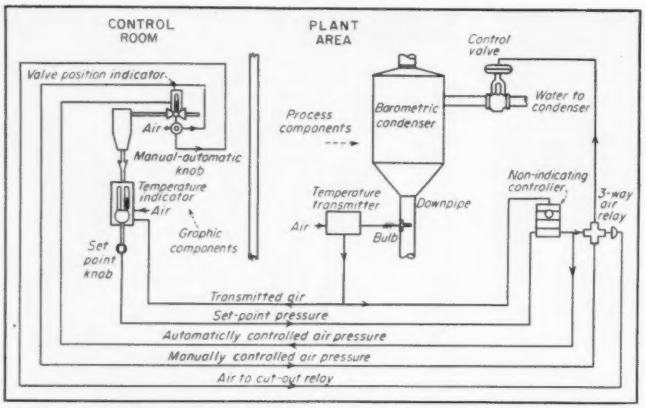
Valve-position indicators, in panel locations identical to valves in the plant, operate similarly to the level indicators. However, below each symbolic valve is a controlled air bypass switch which allows manual control of any valve when desired.

Three control settings are possible from the panel. One governs steam pressure to the first evaporating body, another the water temperature in the down leg of the barometric condenser, and the third determines discharge product density.

An ingenious double-column indicator compares the control setting with the actual process measurement for the three controlled variables. The operator can change a setting by turning a knob below this indicator on the panel and watch the process come back into control by comparing the height of the two colored indicating columns.

Only one conventional instrument appears on the evaporator graphic panel—the Taylor product-density recorder. Since a controlled Baumé is, in essence, the end objective of the control system, it was believed to be the only variable meriting recording space on the panel.

The process supervisor thus is con-



FIVE SIGNALS comprise an individual graphic panel control action. Diagram shows how process-measuring device actuates both panel indicator and plant-site controller. Other air lines allow new control settings, panel indication of the controlled value, and manual control.

fronted with a complete picture of the evaporating system, plus easily identified indications of all variables affecting its balance. Three simple knob adjustments allow him to tune the process to practically any plant conditions other than actual evaporator start-up. And start-up of the equipment is enormously simplified by manual control of its valves from the panel.

How it Works

To achieve simple, flexible control at the graphic panel, the working instrument system which actually deals with the process has to be a model of integration.

Master instrument in the Pekin system is a density controller which regulates the draw-off of product from the last evaporating body in accordance with its Baumé. Level controls, regulating the feed to each evaporating body, then respond to changes in draw-off from the last effect and "tune" the flow of product through the system to density-controller demands.

Because exhaust steam is used for boiling, an interesting instrument "cascade" is employed to keep this variable coordinated with product flow. A pressure controller measures first-effect steam-chest pressure and holds it at a fixed value. However, an instrument measuring supply-tank level is able to reset this pressure control-point whenever flow to the process (or liquor supply) becomes rapid or slow.

Since product density represents a master control for the system, a good deal of applied engineering went into the design of a continuous measuring device that would be sensitive and accurate to product variations within 0.2 deg. Bé. A Fisher displacement-type level controller was ultimately redesigned for the job into what is, in effect, a sort of continuous hydrometer.

By adding a product inlet on the side of the displacer cage (a piezometer ring was inserted here to minimize flow effect), the Fisher unit was converted into a continuous sampling chamber. With the unit completely full of product, any change in displacer buoyant force is due to product-density change. This force is picked up through a suspending lever and torque tube by an air pilot mechanism which furnishes a sensing signal to a controller. The latter, in turn, positions a valve in the product effluent line from the last evaporating effect.

One inherent problem of this density-control system was its time lag due to the ponderous nature of the process. To cope with this, a derivative unit was placed between the sensing device and the controller. This "anticipatory" technique has cut out much of the system lag and brought control to well within a consistent 0.2 Bé.

Behind the Panel

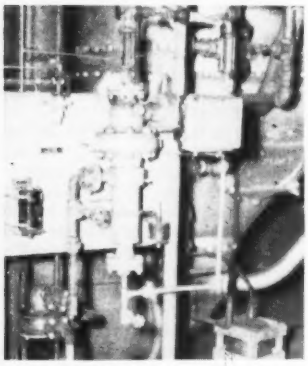
To achieve its remarkable surface simplicity, a good amount of intricacy lies behind the graphic panel, well away from the eye of the unconcerned process attendant. For example, at least four separate air lines are needed for each control action at the graphic panel. One of these carries the measuring signal to the panel. A second conveys the set-point signal to the remote controller. A third pipe delivers controller output and, incidentally, valve-position signal. And a fourth air line from the panel permits manual control of the process.

Contrast this with the single, simple, controlled-air line which runs from instrument to valve in conventional process control.

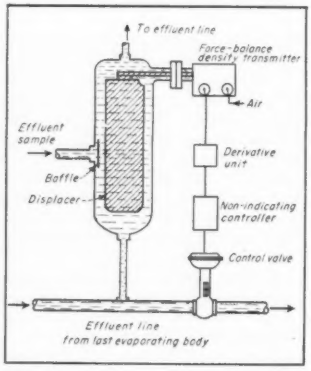
Another complication is the necessary small size of the graphic panel components. An instrument mechanic finds that working with miniatures has its special problems.

But after a year's experience, the instrument department at Pekin claims that the new systems are just as easy to maintain as conventional installations. And from a service trouble and time basis, the new installation com-

(Turn to page 192)



DENSITY measurement of evaporator effluent continuously is provided by this modified displacer-type level controller. Associated non-indicating control units (black cylinders) flank measuring chamber on panel.



PRODUCT-INLET line was added to level controller to flow product through displacer cage. Density buoyancy is converted to air signal, then to control signal by derivative unit and controller.

Engineering Quality Pectins

Through three decades of progressive research, ELP has been adding advanced techniques "one after the other"—thus constantly boosting pectin-process efficiency and economy

GLENN H. JOSEPH and C. R. HAVIGHORST

Respectively, In Charge, Research Department, Sunkist Growers, Corona, Calif.; and Associate Editor, "Food Engineering"

SOLUTIONS of aluminum chloride and sodium carbonate are added to adjust pH for precipitation of green pectin.

Constant refinement of the process, marked by astute design and adaptation of new equipment, has made Exchange Lemon Products Co.'s pectin plant an outstanding example of ingenious research and engineering.

After three decades of technological progress, the present line only faintly resembles the original devised in 1922-23 by the research department of the California Fruit Growers Exchange.

The company's engineers and chemists stand just as ready today to improve upon unit operations. They continually search for more efficient machines and processes to further streamline the production of pectin.

This present line has a monthly capacity of more than 200,000 lb. of pectin. During the 1950-1951 season, total production of all types (basis of 100 Grade) was about 2,000,000 lb. More than half goes to the preserving industry for jellies and jams; the balance is for use in a variety of food and pharmaceutical applications.

Products manufactured include: (1) Rapid and slow setting pectins for jelly and jam uses, (2) a confectionery type, (3) two special pectinates or low methoxyl pectins, (4) three varieties of pharmaceutical quality for various medical applications, and (5) a natural pectin-cellulose form for pharmaceutical purposes.

Raw Material Source

Peel for the process is flumed from the exit end of the pulp stills. These units are part of the unified and centralized operation which begins with the lemon and peel grinding units. Both undergrade whole lemons and the peel resulting from the juice extraction operation are conveyed to these grinders. This section of the line is the source of raw material supply for lemon oil, pectin, citric acid, and stock feed operations.

Macerated peel, from which lemon oil and juice sacs have been pressed and distilled, is flumed 400 ft. to the pectin extraction house. Fluming accomplishes a dual purpose—conveys the material, also leaches the citric acid from it in the flume water.

This reduction to a minimum of citric acid content insures a complete and economical precipitation of pectin from clarified liquors at a later stage. The precipitation of pectin by the so-called "alum process" really comprises a colloidal formation of an adsorption complex, involving the aluminum ion and pectin. This occurs when aluminum hydroxide is formed in the presence of pectin in the pH region near 4.0. Citrates and tartrates interfere with formation of this precipitate.

Pectin Liquor Extraction

At the beginning of the pectin process, flume water is reeled from the peel, which is then conveyed to peel measuring tanks. Pectin liquor extraction, at this point, is a batch-type process. However in every case where batch operations are used, there are two or more units used alternately to provide a continuous flow through the process.

A batch, equivalent to 3 tons of peel, is measured volumetrically—by water displacement—in these tanks. Fresh water is first added to the tank, then that amount of peel which brings the batch to the proper volume. This mixture is then pumped to an extraction tank.

Extraction of pectin from protopectin is facilitated by the use of hot, dilute sulfurous acid. This acid is used because later the excess may be removed by aeration, eliminating residual salts which would have resulted from neutralization of the acid. One recent sulfurous acid (from liquid SO_2) and water are added to the peel to a total volume of 3,000 gal. and an initial pH of 1.8-2.7.

How They Use *All* the Lemon

—is further disclosed in this revealing closeup of Exchange Lemon Products Co.'s top-running pectin operation.

Also, you'll find a 4-page unit-by-unit portrayal of the production layout in this month's big FE Picture-Flowsheet —on pages 134–137.

For "on the line" details of lemon juice and oil processing at this Corona-Covina, Calif., plant, see your September FE (special article on p. 114, and foldout flowsheet on p. 136-139.)

ROPE-LIKE green pectin is filled into cloths on trays. Then it's wheeled to hydraulic press for removal of liquor.

Greater acidities yield more pectin but also result in a deterioration of certain desirable physical properties. Consequently, the compromise pH used may vary from time to time, dependent upon such factors as maturity of the peel. Equilibrium pH values after extraction are usually several tenths higher than initial ones, hence the final extracts run in pH from 2.0 to 2.9.

A perforated cross pipe, in the bottom of each tank, injects steam at 15 psi., and the temperature of the batch is brought up to 95 deg. C. During the coming-up and the holding periods, a total of 45 min., this magma is under constant mechanical agitation to insure a uniform extraction.

After cooking, the magma flows by gravity through pipes to the reel-house. Here, the pectin liquor is separated from the peel and flows to reeled-liquor holding tanks.

Peel from the first two extractions is combined and recirculated by pump to a tank where a second extraction is made. When the fresh peel supply is limited it is sometimes necessary to make a third extraction. Spent peel from the final extraction is pumped to the pulp beds as waste.

Pectin liquor of varying strength (0.4 to 0.7 percent) and some fragments of peel solids are now pumped to filter-aid mixing tanks, where diatomaceous earth is mixed with the liquor (200 to 300 lb. to 2,500 gal.) This mix is pumped to filter presses, which are precoated with the same filter-aid. Liquor from the presses is first tested for clarity. If satisfactory, it is pumped to a cooling tower and its temperature reduced to 30 deg. C. Cloudy liquor is recirculated through the filter presses until it is clarified.

Wherever SO_2 is used in the plant, the areas are serviced with suction fans for employees' comfort.

IN THESE rotary washers, alcohol solution is used to dissolve aluminum precipitate. Insoluble pectin remains.

Blending of Liquors

Aeration of pectin liquor in the cooling tower removes considerable SO_2, with a consequent rise of pH to 3.2 or slightly higher. The cooled liquor (0.5-0.6 percent pectin) is pumped to storage tanks, where it is blended with other liquor to assure uniformity in subsequent steps. Use of sulfurous acid thus permits attainment of a low pH for extraction and, after aeration, raising of pH without addition of buffers or excessive amounts of alkali. It also avoids mold and yeast contamination in the pectin liquor.

Pectin Co-Precipitated

The clarified liquor is pumped from the storage-blending tanks to precipitation tanks. Aluminum chloride solution is added in an amount indicated by laboratory checks for each particular tank of liquor. Sodium carbonate solution is then added until the proper pH is reached, while the liquor mass is being stirred with a sweep agitator. The pH region for precipitation varies from 3.8 to 4.2, with most batches showing optimum precipitation near pH 4.0.

The aluminum salt hydrolyzes in the pectin liquor to form a basic salt that stays in solution until the pH reaches about 3.5, when aluminum hydroxide forms. This colloidal aluminum hydroxide then co-precipitates with the pectin in the form of a yellowish-green curd. This precipitate and mother liquor are separated by means of a copper rotary reel, and the effluent is piped to a refuse sump.

Pressed, Then Shredded

The resulting green precipitate, sometimes called "green pectin," is dropped from a hopper to a floor below, where it is fed into canvas filter cloth "blankets" on the bed of a hydraulic press. Eight or ten cloths are filled with about 200 lb. each of the wet precipitate. These "blankets" are separated in the usual manner by wooden platens. With proper time allowed for drainage and careful application of pressure, the press load is dewatered to about 85-90 percent moisture. Press effluent goes to the sump.

Pectin cake from the press is then conveyed to a slow-speed breaker, where it is broken down to make shredding more efficient. In the shredders, to which the green pectin is next conveyed, the material is cut to desired fineness by opposing banks of circular knives set $\frac{1}{8}$ in. apart. This shredded green pectin drops into a grinder tank in which a measured amount of the second-rinse alcohol has already been added.

Pectin is yielded by the complex precipitate (pectin and aluminum hydroxide) following application of acid in

The "Inside" on Pectin

In citrus, pectin occurs mainly as protopectin—in the white inner rind (albedo), in juice sac cell walls, and in fibro-vascular bundles. And the lemon is a particularly valuable source of this useful complex carbohydrate.

The natural water-insoluble form readily yields a water-soluble pectin upon treatment with acids, alkalis, or enzymes. The pectin liberated has a chain-like molecule of partially esterified polygalacturonic acid units, with molecular weight averaging 200,000-300,000. Under influence of certain organic reagents, temperatures, and pH conditions, the "bundles" of the molecule can either be shortened or made more thread-like.

These processes produce the rapid and slow setting pectins and some of the specialty pectic substances. Ordinary high methoxyl pectin does not form thermo-reversible gels like those of gelatin, but rather forms a gel only at pH values below about 3.5 and in the presence of more than 40-50 percent of a dehydrating substance.

In jellies or jams, the time required for incipient gelation, after a suitable cooking period, is the "setting time." Jams containing fruit or berries must set rapidly while still hot to prevent floating of fruit.

However, jellies lose desirable internal characteristics if jostled while setting. Hence, a slow setting pectin is preferred so the jellies may be packed and put in undisturbed storage before gelation is complete.

And How It's Standardized

Pectin used in foods is gaged on its ability to form fruit jellies. And here the criterion is the "Jelly Grade"—that is, the ratio of weight of sugar to weight of pectin in a normally firm jelly and with 65 percent total soluble solids.

Preserve companies have become accustomed to use the 150-grade type, so pectin makers blend in sufficient refined dextrose to reduce the grade to a constant figure of 150.

Samples from the 2,400-lb. blends of unstandardized pectin are lab tested for such characteristics as jelly grade, setting time, pH, particle size, color, odor, flavor, solubility, ash, and moisture.

Actual jellies are made from each packed lot—totaling many dozens each day—to insure against error in blending. Testing is with a "Ridgelimeter," an instrument devised by Sunkist and now employed in laboratories all over the world.

Low methoxyl pectins require standardization techniques quite apart from ordinary pectins. Called for is blending (and sometimes addition of dextrose) until lg. will require 25 mg. of calcium to form a standard gel with a 30 percent sugar solution at a fixed pH and temperature. One form of low methoxyl pectin is standardized so it will produce a normal aspic-type gel using tomato juice.

A pectin made particularly for confectioners is standardized so it will produce an 80 percent sugar-solids gel with a very slow time of set, using a recipe scaled down from the conventional.

Standardization of the several pharmaceutical pectins involve many more tests.

dilute alcohol, the pectin itself being insoluble whereas the aluminum compounds dissolve. When the precipitate is kept porous, finely divided, and not too compact, the washing away of non-pectin substances is easily accomplished.

Pectin and alcohol slurry is pumped from the grinder-tank to a 1,600-rpm. Bird continuous centrifugal and separated. From here it is conveyed to the first acid-wash tanks, which have been previously filled with solution from the acid-alcohol storage tank. Effluent from the centrifuge, like all alcohol that is recovered, is pumped initially to the alcohol neutralizing tanks and then to the still feed tanks.

The slurry in this first acid-wash tank, after addition of the pectin, contains alcohol, acid and water in the following percentages: 55, 6½, and 38½ respectively. The pH is adjusted to approximately 1.0. On completion of the wash, the slurry is pumped from the wash tank to one of the seven rotary-drum pectin washers.

Of company design, these steel washing units are rubber-lined and have one flat side in which is a filter. After filling with slurry, a vacuum line is connected to the filter attachment and the acid-alcohol is drawn off through a filter cloth by a 15 in. vacuum. It is collected in the No. 1 alcohol receiver and subsequently drained to the alcohol neutralizing tanks.

Slow-Set Pectin

Following completion of the first acid-alcohol wash, material which is to be slow-set pectin is dumped from the washer into a buggy and filled into retardation tanks. Second-rinse alcohol and hydrochloric acid are added. These units are equipped with steam coils and the slurry is agitated and heated to 35 deg. C. for a predetermined time, usually 10-20 hr. At this point of the process, temperature and time determine how slow the finished product will set. It is then returned to a washer, and the acid-alcohol is filtered off to the No. 2 receiver and subsequently discharged to acid-alcohol storage.

Rapid-Set Process

Following the completion of the initial acid-alcohol wash, there is added to the pectin remaining in the washers a metered amount of first-rinse alcohol (60 percent). Then the washer is rotated for 5 min. The rinse alcohol is then filtered off, collected in the No. 1 receiver, and subsequently drained to the neutralizing tank.

A measured amount of acid-alcohol, from the make-up tank, is used for the second acid-wash. This solution is comprised of 91 percent alcohol (70 percent strength) and 9 percent hydrochloric acid, and it has a pH of .5-.6. The washer is rotated for 15 min., the solution filtered off, drawn to the No. 2 receiver, and then goes to acid-alcohol storage.

Common Steps

The process for both rapid and slow-set pectin is the same from this point on. The second acid-alcohol wash is followed with two separate rinses with first-rinse alcohol. In each case, a gaged amount of alcohol is added to the pectin and the washer revolved for 5 min. Following rinsing, the alcohol is filtered off to the No. 3 receiver and subsequently drained to first rinse storage.

A measured amount of redistilled (75 percent) alcohol

(Turn to page 160)

LATEST AND LARGEST fresh milk canning plant—the new Ridgeland, Wis., facility of International Milk Processors.

Progress in Canned Fresh Milk

Product enters new market phase with International's high-volume Wisconsin operation. Company's bid is for sales in small, vending-size package

FE STAFF

Aseptically canned whole fresh milk is becoming a potent force in today's far-from-static dairy economy.

Ever since the first plant went on-stream (see "Canned Fresh Milk Now a Reality," FE June '51, p. 71–74), dairy planners have kept a hawk-like eye on its progress.

And this interest has become more acute with Golden State Ltd. coming up with its product early this year and a second International Milk licensed operation starting production last spring in Visalia, Calif.

Perhaps the greatest impetus to dairywide adoption of canned fresh milk, however, is the debut of the latest and largest processor, located in Ridgeland, Wis.–the first of several units to be owned and operated by product pioneering International Milk Processors, Inc. For, not only will its 2,400-gal.-per-hr. volume make a sizable splash in dairy marketing, but most of its output is aimed at a highly interesting consumption, in the form of 6-oz. cans for spot drinking at the metropolitan vending machines. Heretofore, this product was confined to gallon units designed for remote, milk-scarce areas.

First 4,000-gal. rail shipment of the small units has gone to Juice Bar Co., New York City, owner of several thousand vending machines. Meanwhile, bulk of the already processed product is headed for Cuba for use in General Batista's nation-wide school lunch program.

Aside from its revolutionary entry into the vending market, the Ridgeland facility incorporates many operating and engineering improvements that point to easier adoption of the process by dairy operators.

"Pipeline" Barns

Setting up the Graves-Stambaugh milk collecting system in the small-herd Wisconsin milk shed–typical of much of the U.S.A.–posed a problem. Here, farmers with 20 or 30 cows could not afford the elaborate milking parlors used for large west coast herds. Nor did they cotton to the idea of changing their stanchion type barns, which were so well suited to severe Wisconsin winters.

The solution was to employ a low-cost permanent sanitary glass piping system along the stanchions. By valve connections, the teat-cup hose clamps into this pipe system at each stanchion. And milk is drawn directly from the cow into a stainless steel collecting tank which is also under milking machine vacuum. In this manner the milk travels in a complete closed system and is never exposed to air or dirt.

Sanitation aspects of permanent barn piping are excellent. A return pipe makes a loop of the system and permits frequent flushings by reverse flow. In one such barn visited, a 180-deg.-F. hot water rinse of the system followed milking. Then, twice a week a thorough circulation of acid and alkali base solutions was carried out. These detergents were made up in a regular 10 gal. milk can and piped directly into the system.

Needless to say, visual inspection possible with glass piping offers unprecedented opportunity to keep in-barn bacteria count build-up at a minimum. Further, because pipeline sanitizing is so easy, a high degree of cooperation is possible from the farmer.

Another change, necessary in the collecting system, was to replace the 100 and 200 gal. stainless steel tanks (as used in West Coast pickups) with 50 gal. units. Milk inlet-outlet and vacuum valves are on top of the new tanks. Because of their smaller size, they are easily handled by the farmer.

In-Plant Changes

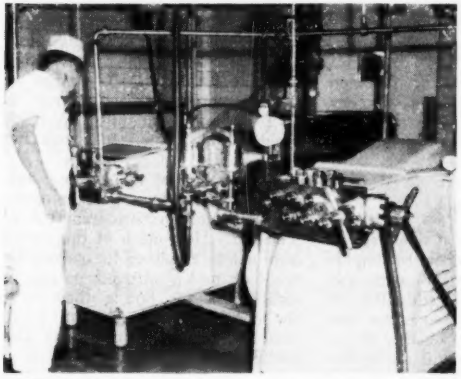
A new system of discharging farm tanks has boosted efficiency at Ridgeland. Previously, these vessels had to be hoisted above the process preheating tanks for gravity unloading. Now they are rolled into a special receiving area and hooked-up–by means of Tygon tubing–to a suction discharging pipeline that empties directly into process tanks on the floor above. Also, another connection at this discharge-pipe manifold places nitrogen over the milk as the tank is emptied.

Empty farm tanks are rolled to a

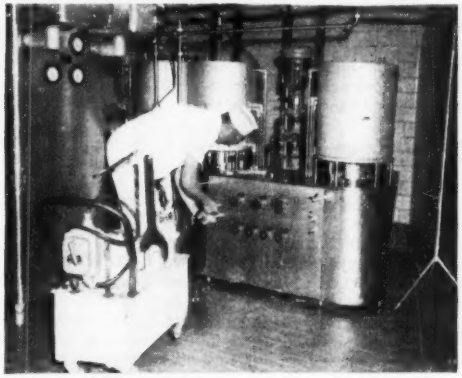
New Devices that Spur Operations

FIFTY-GALLON farm tanks suit the smaller-size Wisconsin herds. Kept under vacuum, these tanks are trucked in by routine pickup system as done on West Coast.

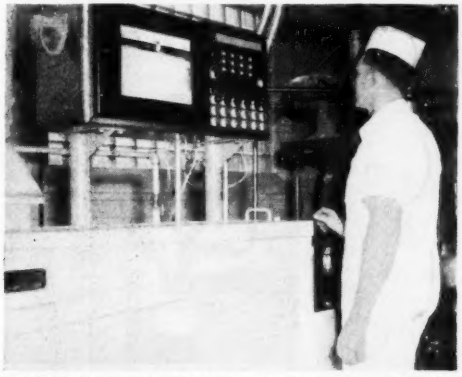
TANKS are discharged into closed process by suction through Tygon connector. Rubber hose supplies the nitrogen gas that blankets the emptying milk.



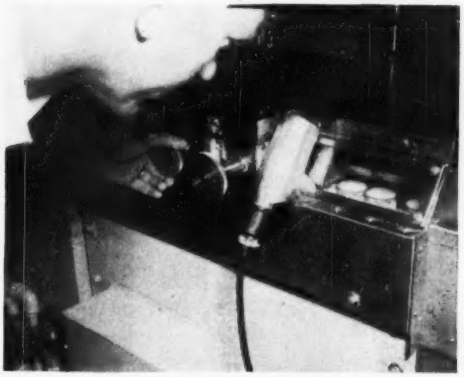
CONTINUOUS PREHEATER (between homogenizers) eliminated the old batch heating in process tanks. Behind this equipment is the new standardizing clarifier.



HEAT EXCHANGERS are "broken apart" for cleaning by hydraulic thrust delivered by portable pump (left). After sanitizing, exposed plug drops down and locks in place.



FLASHING LEGENDS (above pushbuttons) keep attendant abreast of process. Strip-chart recorder (left) details operating conditions in Martin canning unit below.



SIX-OUNCE CANS—designed for spot-drink vending machines—are seen running under the filler in Martin aseptic canner. Operator is adjusting fill level.

sanitizing station, located across the receiving area. Four empties can be cleaned at one time from a series of hot water hoses.

Several improvements now add up to completely automatic operation of the process (preheating) tanks, which are the start of the sterilizing process. At Ridgeland, no one ever visits these units except for wash up. Integrated sanitary connections have been made for the level-probe, nitrogen, and vacuum connections, and all automatic valves are now air-operated and fail-safe when pressure is lost.

Feature of these shut-off valves is the remarkably simplified seating arrangement, which prevents leakage at 24 in. vacuum operation.

Two batch operations at the process tank have been converted to continuous. A standardizing-clarifier was installed between the tank and homogenizer to delete batch standardization. And a tubular heater is now employed before the homogenizer to eliminate retention time due to batch heating in the process tank.

It is interesting to note that continuous preheating has permitted a higher incoming temperature to the sterilizer and thus reduced burn-on.

Split Heat-Exchangers

At the sterilizer-cooler station another technique is employed to obviate burn-on. Steam-supply piping to the shell of the sterilizer is split—so that low pressure steam is furnished to the first section while 125 lb. plant steam goes to the final portion. Thus, incoming milk is heated in safe stages.

The cooler unit—identical in construction to the sterilizer—has a similar split piping. However, the same temperature cold water goes to both portions of its shell. Thus, halfway through the unit, milk is exposed to a second low-temperature gradient. Improvement in cooling has been remarkable. The unit now reduces 300 gal. per hr. from 285 to 82 deg. F.

Because the Ridgeland heat-exchangers are much larger than in previous installations, an automatic hydraulic system was devised for raising the internal plugs for cleaning. A portable pump clamps into a connector and supplies 1,600 lb. for raising. When pressure is released after cleaning, the plugs settle down into their jackets by gravity and hydraulically lock in place—with no knobs needed for securing. Before raising, however, steam is allowed to flow to the outer jacket and cold water inside the plug to ease separation of components.

Other innovations are the 1-in. product piping and a new type connection used throughout the process. All pipe connections are made with an inside-flush insert sleeve and a concentric O-ring seat that clamps between pipe ends. This construction will not leak at 1,500 lb. pressure, yet can be loosened by hand. It was designed by Edward Kuhles, engineering consultant to the firm.

"Traffic-Cop" Control

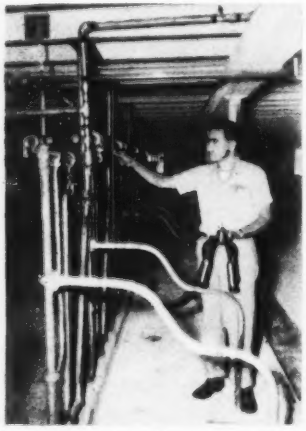
A new red and green signal station was devised for Ridgeland to simplify operations at the Martin aseptic canning unit. Printed legends flash on this panel, to tell the operator how start-up is proceeding, whether all sections of the canning unit are on the beam when running, and whether there is any condition at any point in the system that may require his immediate attention. A red light background means, of course, temperatures or conditions below standard, and green indicates normal operation.

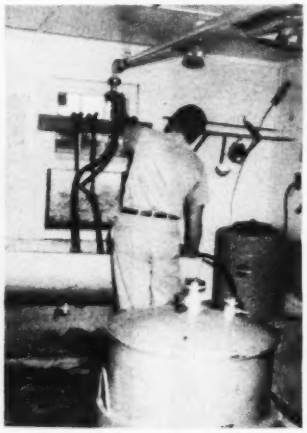
The legends that flash on to guide the operator are as follows: (1) sterile milk; (2) sterile cans; (3) sterile covers; (4) hold; (5) sterile filler; (6) sterile closing machine; (7) sterile milk. During start-up these become green in sequence, and the operator then sends sterile milk into the system. Should any "red" condition show up the process will either switch to water automatically or the operator can take his cue from the "howler" and correct things via panel pushbuttons.

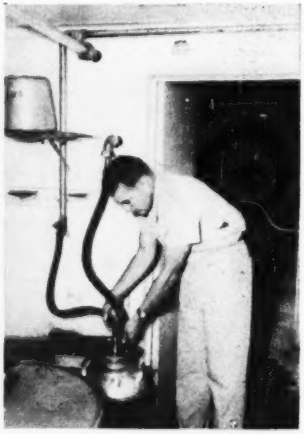
Signal lights are also provided at the aseptic canner panel to advise which process tanks are in use and the state of raw milk supply at any time. The operator can thus mesh the speed of the Martin unit with current and planned production rates.

While the filler at Ridgeland is basically the same as that previously used—now running 6-oz. cans rather than the usual No. 10's—it has required a flexible level adjustment to fit it to the smaller units. Also, to match process capacity its rate has been upped to 250 per minute.

At the time of this writing, two Martin canning lines were in operation and one more was ready for installation. How much of this equipment will be employed for making the new 6-oz. package depends on merchandising success during these next few months. But the standard 1 gal. cans for overseas shipment will also continue to be run at Ridgeland.







BARN PIPELINE SYSTEM solved problems of collecting milk from small Wisconsin producers. Left: Glass pipe runs along stanchions. Milking machine supplies vacuum for system. Return pipe permits in-line reverse-flow sanitation. Center: Flushing follows each milking. Right: Detergent is made up in can for periodic application.

STAINLESS steel tank truck with 2½-in. insulation hauls juice from Florida to Boston. Note nitrogen connection.

Keeping Orange Juice Fresh

New technique uses selected ultraviolet rays to aid processor in delivering "fresh" juice to bottler 1,500 miles away. Nitrogen blanket and controlled temperature play roles in method

C. E. WRIGHT
FE Correspondent, Jacksonville

Single strength orange juice is now shipped in tank trucks from De Land, Fla., to Boston—a distance of 1,450 miles—without the use of a refrigerated truck, and without deterioration in quality or loss of flavor.

Secret of the juice's keeping quality is its exposure, immediately after extraction, to irradiation with selected ultraviolet rays, followed by quick cooling to 33 deg. F., and maintenance of a low temperature during transportation in insulated trucks, and storage.

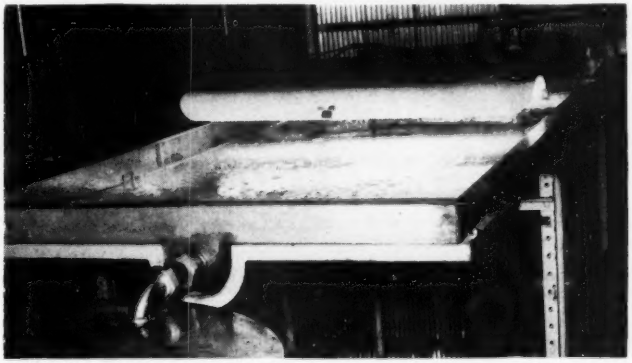
Juice is extracted and processed at the De Land plant of I. D. T. Cancer Research Foundation. The first long distance customer is Orange Food Products, Inc., Dorchester, Mass., which fills the juice into qt., ½-gal., and gal. bottles for sale through grocery outlets, dairies, and to institutions.

Shorter hauls are made to the Naval Air Station, Jacksonville; three small dairies in Georgia; and Foremost Dairies, Savannah and Jacksonville.

Standard washing procedures are applied to the fruit in the De Land plant, but they are graded more heavily than is customary to eliminate any unsound oranges. Juice is extracted by four Food Machinery units that were specially built to insure low oil content—oil is held to a maximum of 0.005 percent.

From the extractors, the juice goes to a paddle finisher for removal of coarse pulp and seeds. Then comes the irradiation process, during which

(*Turn to page 162*)



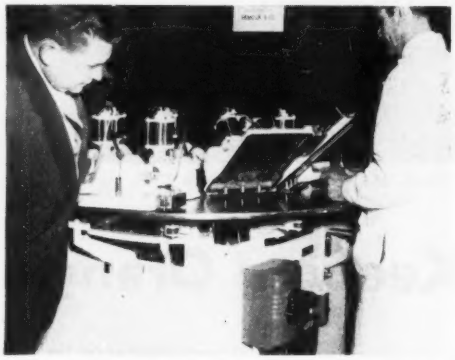
IMMEDIATELY following extraction, juice is irradiated with special mercury vapor lamps that do not destroy vitamins.

Advanced Meat Processing Units Highlight AMI Show

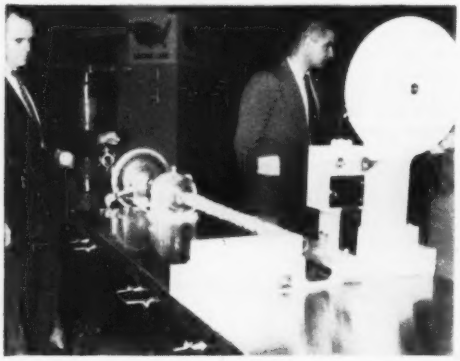
Among 18 new developments unveiled were packaging machines, stuffers, temperature indicator, scale, dehorner, pump, and transport refrigerator

Special Packaging Machines

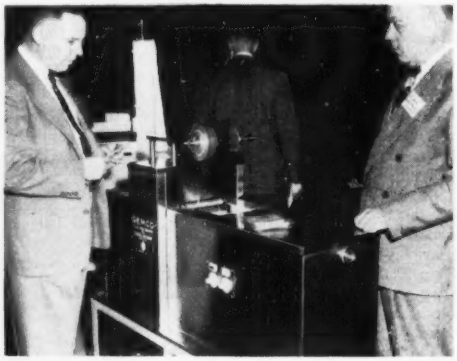
TIGHT, contour wrapping of regular and irregular shaped items is performed with this unit, using pliofilm. Fed from roll, film is heated and stretched as it is vacuum drawn into pocket. Rate: 16 heat-sealed packages per min.—Stokes & Smith Co., Philadelphia. (94A)



VACUUM PACKAGING unit for flexible films handles 40 packages per min. Semi-automatic and rotary in action, it vacuumizes and heat seals perishable goods packed in pouches. There are eight pivoting vacuum heads. Maker: Standard Packaging Corp., N.Y.C. (94B)



STUFFING UNIT has volumetric gage, hydraulically operated, hooked up to sausage stuffer and long spinning tube. Pulled over tube is casing into which 4-12 oz. portions of meat are fed. Ends are sealed with clamps. Rate: 60 per min.—Globe Co., Chicago. (94C)

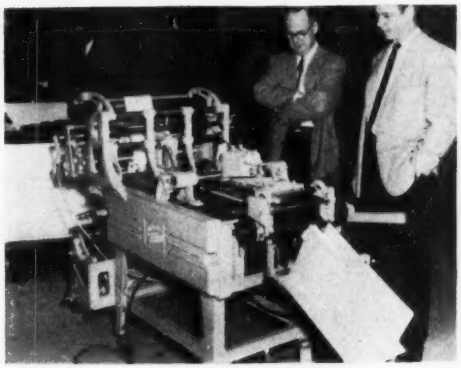


FLAT-PACK WRAPPER turns out 60 packages of sliced luncheon meats per minute. Unit does without trays, cards, or U-boards. Meats are fed between films from two rolls. Films are heat sealed (four sides) and cut.—General Machinery Corp., Sheboygan, Wis. (94D)

Want more information about any items in this picture article? Just circle key number (in parentheses at end of each caption) on the Reader Service coupon adjacent to the inside back cover.

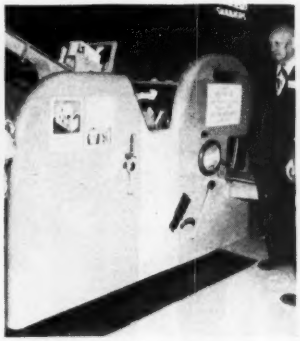
Two More Pages of New Units →

MOLDER forms, discharges eight 1-oz. sausage links or four 2-oz. meat or fish patties into wallet-type package without need to check-weigh. Unit attaches to sausage stuffer to turn out 15-25 packages a min. Maker: Basic Food Materials, Inc., Vermilion, O. (95A)



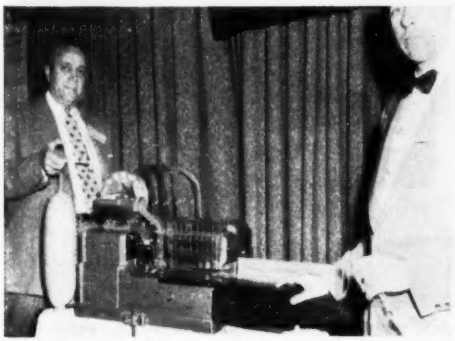
SPEEDY machine forms sealed bags 4,000/hr. for sliced bacon, other meat products. Attachments include electric eye control, heat-sealed labeler, glue-seal labeler, heat-seal bander, and bottom crimper.—Miller Wrapping & Sealing Machine Co., Chicago. (95B)

AIR-OPERATED UNIT pressure seal-packs boneless items (300-400/hr.). Eliminates improper tying and shriveled products. Meat is forced into casing; ends are sealed with valve-type buttons.—Irving Machinery Co., Philadelphia. (95C)



AUTOMATIC UNIT, offered by Peters Mach. Co., Chicago, forms and parchment paper lines cartons 150/min. Machine is adjustable to set up 1 to 4-lb. lard and shortening cartons, which discharge onto conveyor. Locked cartons fill neatly, compactly. (95D)

NEWLY DESIGNED foot-operated perforator codes 250-350 papers a min. with six numerals (date figures if desired). Codes labels, films, and inspection slips. Numbers orders and cancels revenue stamps.—American Perforator Co., Chicago. (95E)

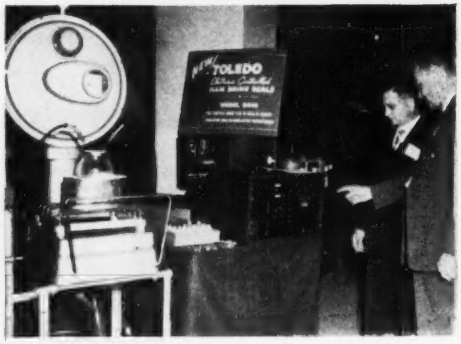


TYING MACHINE pleats casing, crimps metal closure, and punches holes at rate of 30 per min. Closure for casing assures straight hang on smoke sticks, cuts cost of casing, and increases stuffing capacity.—Manufacturer: Tipper Tie, Inc., Union, N. J. (95F)

FORMER AND STUFFER has two stuffing heads, and can handle all sizes. Hooked up to air line with 100 lb. pressure, unit stuffs boned hams, picnics, ham ovals, and boiled hams, also meat loaves, into casings.—United Butcher's Supply, Toledo, O. (95G)

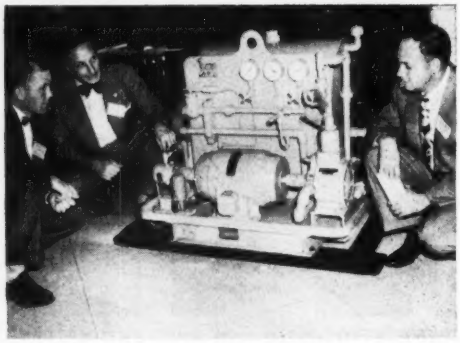
Variety of Other Advanced Units (AMI Show, Cont'd)

COOKING METER has multi-probe sensitive element to measure internal temperature of meats. Switch selects any of six probes, and when pointer is set to indicate cook-off temperature, red light blinks and alarm rings. Maker: Swieco, Inc., Fort Worth, Tex. (96A)



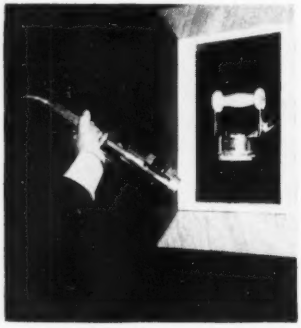
HAM-BRINE SCALE is electronically controlled. It automatically weighs ham and starts pickle pump. Scale has 12-unit control station, electronic-control cabinet, also two brine needles, hoses, valves. Accuracy, labor saving are accented.—Toledo Scale Co., Toledo, O. (96B)

FOOT-OPERATED DEHORNER. Air cylinder actuates horizontal knife that slides forward to cut the horns from cattle heads. When cover of unit is closed, steam valve opens automatically to sterilize knife. Displayed by Globe Co., Chicago. (96C)



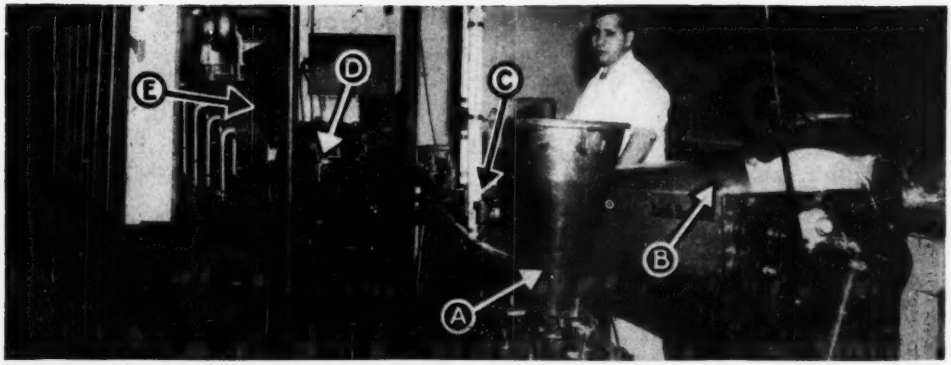
ELECTRIC FLUID PUMP is for high-low hydraulic press operations. It generates pressures up to 10,000 psi. When predetermined high pressure is attained, it is trapped and held until released. Made by Cincinnati Butchers Supply Co., Cincinnati, O. (96D)

NEW TRANSPORT refrigerator is dual powered—gas engine on road; electric motor on dock. Starter-generator and relays offer positive temperature control. Fast-action defroster is switch-operated. — U. S. Thermo Control Co., Minneapolis. (96E)

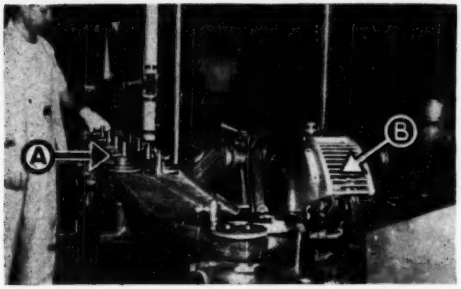


THERMOSTATICALLY controlled branders assure sharp impressions on ink-branded meats. Temperature of electric branding elements is controlled. This also prevents ink from drying on brander. — Great Lakes Stamp & Mfg. Co., Chicago. (96F)

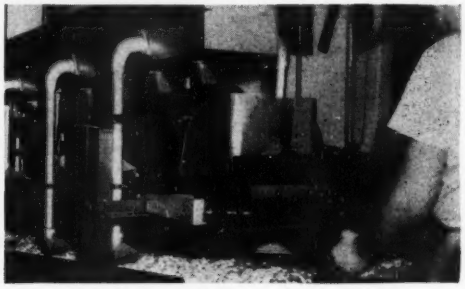
PEELING UNIT strips casing from frozen link sausages (600 lb./hr.). Steam (10 psi.) is forced through unit's barrel to wet casing, which is slit by pivot-mounted knives. Links are shelled from casing.—Visking Corp., Chicago. (96G)



ADVANCED SETUP: (A) center-feed machine, (B) batch-former, (C) sizer, (D) forming-cutting unit, and (E) cooler.



CENTER-FILLED ROPE is fed to sizer (A), which reduces its diameter. Rope is then shaped and cut by former (B).



FINALLY, candies are chilled in cooler, which has air ducts that cold-blast confections on conveyors.

"Sweets" at 250 Lb. an Hour

Eastern candy maker uses special 5-machine line that "robots" filling into pre-formed rope, then continuously processes it to finished pieces ready for packaging

JOHN V. ZIEMBA
Assistant Editor, "Food Engineering"

Turning out over 250 lb. per hr. of plain or filled hard candies on one line is a terrific speed.

Yet, that's what the new five-machine Hansella hard candy line is continuously producing at Just Born's Bethlehem, Pa., confectionery plant.

This highly efficient production line comprises an automatic machine for feeding fillings into hard-candy rope, a batch former or spinner, a four-step sizer, a forming and cutting unit, and a three-tier cooler.

All this equipment is designed for quick adjustability, ease of control, and coordination of component processing stages to assure large scale operation with trouble-free performance. Overall result is a fully automatic line for converting filling and 90-lb. batches of hard candy to such standard shapes and sizes as cushions, pillows, balls, kisses, and barrels by means of readily interchangeable dies.

And the same line can, of course, turn out unfilled hard candies.

Action on Line

Here's how hard-candy centers are made on this advanced line:

Filling material is fed into a 75-lb. capacity, cone-shaped hopper. From here, it is pumped through a rubber hose and a 1-in. dia. by 5-ft. long brass pipe, running the entire length of the batch former. The pipe is lashed with cordage and coated with beeswax to prevent candy from sticking to it.

Rate of feed is easily adjusted by means of a scale. And change of the type of filling, as well as thorough cleaning, requires only a few minutes.

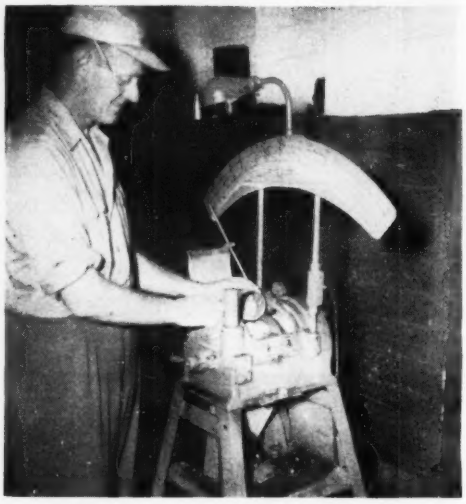
Forming the Rope

In operation, approximately 90 lb. of candy are fed into the batch former —going between two sets of horizontal, steam-heated, conical rolls and around the pipe supplying the filling. As these rolls revolve intermittently and alternately change direction of rotation, the candy is spun into the shape of a tapered rope.

Immediately before this pre-sized rope leaves the batch spinner, it receives the filling. By merely turning a crank, the rolls can be easily adjusted to an inclined position.

(Turn to page 176)

Temperature and Tenderometer . . .



QUALITY is pinpointed in new company-controlled crop program. Field weather station (left) provides tab for daily growth "heat units". Tenderometer (right) gages maturity of crop.

Trends Speed Cannery Pace

Bring changes in growing, processing, waste disposal, byproduct utilization. Results: Quality. Savings. New product. Richer land

J. P. KRAEMER

President, Mammoth Springs Canning Co.
Sussex, Wis.

It is much different today—this business of canning peas. Only the basic process remains.

The war did much to spur this metamorphosis. Labor scarcity resulted in mechanized techniques that canners had long believed impractical. And a premium for land, fertilizer, and fieldhands sponsored a veritable revolution in canning-crop agronomy.

In taking stock of improvements here at Mammoth Springs Canning Co., we could list many specific techniques, both small and large, which underlie a vastly changed food business. But four broad advances best sum up the change, namely:

1. New precision in planning, planting, and harvesting crops.

2. Unimpeded speed from harvest, through viner, and into the can.

3. Mechanized materials handling, both in cannery and warehouse.

4. Extensive use of waste and operational byproducts.

How has all this paid off? Let us cite one important example: Just a few years ago we were delighted to have as much as 50 percent of our pack classify as "Fancy". Today we can invariably rely on over 80 percent of the pack in this category.

Producing Quality Peas

A basic premise behind the marked changes in today's growing and harvesting of peas is that processing itself rarely does anything to improve product quality. The real potential for improvement has been in pre-cannery activities.

To achieve better control of this pre-cannery phase, we necessarily went into the farming business. Now we grow over half our pea pack on 1,700 owned and 2,000 rented acres. These fields are grouped within two or three miles of vining stations which serve our three plants at Eden, Oakfield, and Sussex—all in Wisconsin.

To keep our crop-producing soil in top condition, we practice crop rotation on all farms. During the first year, sweet corn is grown. The second year, peas are the crop, alfalfa being seeded while the peas are growing. In the third year, we harvest alfalfa.

While its soil-conditioning function is primary, the alfalfa—four cuttings each year—is a profitable byproduct. Our Oakfield location is equipped with a large dehydrating plant that turns out 2,000 tons of premium alfalfa meal a year—fully one-fifth of Wisconsin's consumption. But more about this later.

With positive control over type and condition of our seed, plus a detailed knowledge of weather and soil conditions in each area, it is possible to plant our pea crop so that fields will mature in calculated sequence. This serves to extend the pack over a longer period.

Fertilizer applications are stressed in our field program, and periodic soil analyses are made of all fields. Indicative of this accent on proper soil fertility is the use of fertilizer attachments on all planting machines.

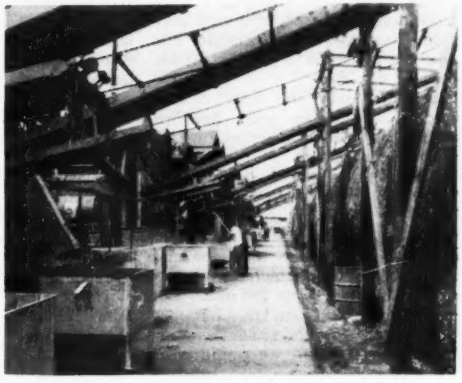
In planning and determining harvest schedules, the recent theory of

. . . Speed Crop to Can

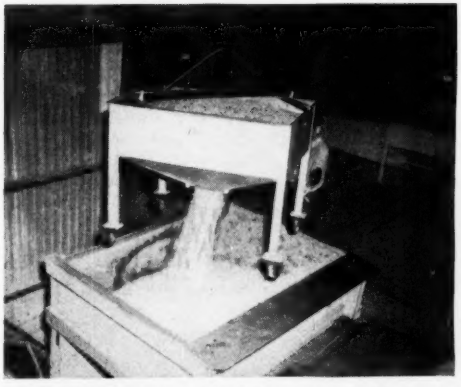
TANDEM SWATHERS quickly windrow selected field of peas at height of maturity. Company-owned units are telephone-routed to site from headquarters.

SIDE-DELIVERY loaders, following swathers, load trucks which speed to nearby vining stations. Note alfalfa stand, which is part of planned rotation.

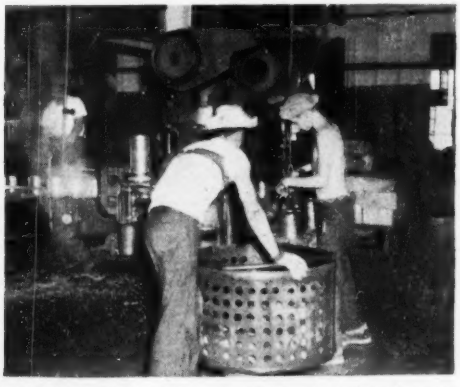
PEA TRUCKLOADS are depodded by pairs of viners at this huge station. Fifty-man crew is flown up from Louisiana for 30-day season.



VINES TRAVEL overhead to stack, peas go in portable metal hoppers which are truck-borne to cannery. Giant vine stack measures 280 x 46 x 40 ft.

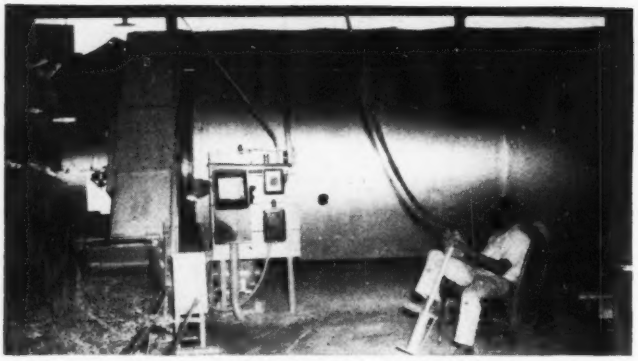


HALF TON of peas cascades into cannery feed-in hopper. New bulk-handling method has eliminated small lug boxes, improved sanitation.



SEALED-IN QUALITY is effected just 2-hr. after the peas were harvested. This high-speed, four-spindle, gallon can sealer removes former bottleneck.

Crop Byproduct



ALFALFA DRYER has remote feed control. Operator balances supply with outlet air temperature. Drying plant is profitable. It was used to convert poor sweet corn to animal feed, and can handle other crops.

growth "heat units" is applied. This theory holds that maturing a crop takes a certain number of degrees over a minimum growing temperature. For peas the minimum is 40 deg. F.; for corn, 50 deg. F.

It takes 1,360 "heat units" to mature a crop of our peas. And we usually can predict harvesting time to within a few hours.

To collect "heat unit" data, we have "weather-stations" at our three plants. These are ventilated shelters, set far apart from buildings, which house high-low registering thermometers. Also, a recording thermometer at Sussex headquarters shows the round-the-clock trend. Each day this information is tabulated. And to get the number of "heat units", we simply take the mean daily temperature, subtract 40 (minimum growing temperature) and multiply by 24 (hours).

The heat-unit theory—widely developed for the area by the University of Wisconsin and the can companies—has brought a new precision to harvesting operations. Recently, it also has been correlated with certain insect activity, allowing preventive measures to be taken at predicted critical times.

Incidentally, rainfall variations do not influence theory calculations. Rain affects crop size, but not maturity.

Three days before fields are ready to harvest, tenderometer readings are taken of sample peas. Then cutting is roughly scheduled. A day before harvest, samples are again gaged with a tenderometer, and the most mature peas are slated for first cutting on the following day. If all tenderometer readings are alike, cutting priority is determined by spot inspection.

Company-owned swathers operate in tandem to cut and windrow the peas. Following almost directly behind these are two tractor-driven side-delivery loaders which elevate the windrows onto dump trucks. There usually is no more than 30 min. between first reaping and movement of that batch of peas to the viner station.

Into Cans Quickly

By meshing closely knit communications with power-moving equipment, we endeavor to seal the peas in cans within 2 hr. after the crop is cut. We thereby preserve field quality.

To speed activities at the vining station, tractors are used to work the top of the vine stack. And the trend has been to larger stations to secure full advantage of this power mover.

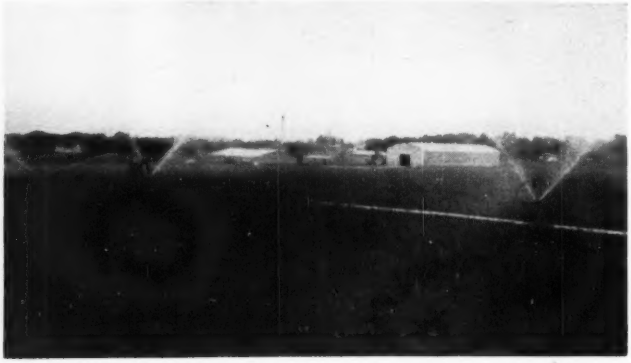
All viners have been equipped with individual motor drives and a variable-speed pulley. This permits control of viner throughout in accordance with heaviness of incoming vines, keeping bruises and splits to a minimum.

Typical of a remarkable change in our operation's labor dynamics is the crew that worked our 14-viner Oakfield station. A very fine gang of 50 young men—many of them college students—came up from Louisiana for the third successive year. And following a month on peas—they averaged 14 hours a day, sometimes seven days a week—this crew went on to Wisconsin cherry harvesting and came back in time for our corn pack.

Loss of local labor—first to the war and then to Wisconsin heavy industry—forced us to "import" crews. But every gang has been satisfactory. Another viner station, for example, employs a Negro crew flown up from the Bahamas. And still other crews are composed of Mexican nationals.

Waste Is Sprayed

PUMP draws cistern-collected wastes and delivers them to field pipelines.



ALUMINUM line is made of 20-ft. sections, has nozzles every 40 ft. Pipe is easily moved by one man. Note Oakfield plant in background.

Special self-contained camps have been set up to house and feed these groups.

Lug Boxes Eliminated

Podded peas discharge from the viners into special 1,000-lb.-capacity containers. These are metal hoppers mounted on casters. They have replaced the 40-lb. lug boxes which required so much handling and sanitation. Six such hopper carriers—first rolled over a scale for weight logging—comprise a load for truck delivery to the cannery.

A typical day's output at Oakfield was 146 truckloads, carried by 13 trucks operating out of this location.

Telephone communication between each plant and all vining stations permits central supervision and routing of peas to each cannery. Every hour each station reports peas on hand, peas in transit, and harvest batches accumulated from dump trucks.

With this communications system and central integration, it is possible to meet the 2-hr. field-to-cannery maximum, yet handle emergency jam-ups at any site.

Cannery operations have been re-oriented to mesh with the new, fast-paced field activities. Incoming hoppers have samples removed for tenderometer testing as soon as they hit the receiving platform, then are routed to the appropriate canning line. An electric hoist suspends the bottom-discharge hoppers over chutes which feed elevators supplying second-floor cleaning and grading operations.

Mechanizing Pays Off

With 30 percent less personnel, we now achieve 50 percent more volume than in pre-war days—excepting the inspection tables. Mechanization has been the canner's salvation in these days of rising equipment and operating costs.

One of our first major changes in this direction was the palletizing of all plant materials and warehouse stock. To effect this, at least two industrial lift-trucks were placed in each plant.

Postwar building and additions to our warehouses have all included the height and aisle-space necessary for effective pallet-truck movement. We now load our full cases eight tall—56 cases per pallet—and tier pallet loads in three-high stacks. This has reduced the manhours needed in warehousing by about 80 percent.

Can movement, from the sealer on, has witnessed a remarkable series of improvements in the past decade. Cans now are put into retort baskets in jumbled fashion, improving heat transfer and saving labor. And after retorting, basket loads are electrically hoisted to dump the contents onto a moving belt feeding an unscrambling device. In one of our lines, a new unit separates a jumbled crate load into five parallel end-to-end lines feeding a single discharge belt—all in a matter of 2 or 3 min.

Another of our lines employs an unscrambler designed by our plant mechanic. This employs a revolving disk and guide-rail to bring upright cans into single file.

The same unscrambler handles empty cans coming into the plant in a shipping wrap. An attendant with a "can fork" could place a maximum of 75 of these cans onto the cable track per minute. Now over 300 per minute are handled by the unscrambler.

Most of our lines employ horizontal-thrust, four-tier electric boxers which fill a case every 6 sec. Filled cases then travel on a belt to a pallet-loading station and warehousing.

Automatic can handling pays off doubly since a major part of our pea pack is warehoused before labeling.

Byproducts and Waste

We consider our alfalfa project an integral part of the cannery operation, and it has more than paid its way in recent years.

Employing an automatically controlled dryer, the alfalfa plant can handle three tons per hour to produce approximately one ton of dry feed of 7 percent moisture content.

Careful drying control, and a special technique for instant cooling insure a high vitamin A content. Consequently, the product has commanded a premium price for use as chicken mash—its principal market.

To supply dehydrating operation, a tilting platform dumps truckloads of field fresh alfalfa onto a chain slab conveyor which serves a large, spiked feeding roll. This roll slowly moves the product into a cylinder chopper which works like a lawnmower, and the chopped up stream then feeds into the long, kiln-like hot air dryer on a belt conveyor.

The alfalfa stream to the dryer is manually controlled to keep the dryer outlet-air temperature at 265 deg. F. This is done by remotely regulating a home-designed variable drive.

Three passes through the triple concentric shell of the dryer reduce product moisture to less than 7 percent. Hot air is supplied to the operation from a coal-fired furnace at 1,600 deg. F. Exhaust fans draw it over the product in transit.

Passage through a drying cyclone to separate moist air follows. Then a pass through a cooling cyclone drops the dry alfalfa temperature to 150 deg. F. After being pulverized in a hammer mill, the product passes through a water-cooled screw conveyor for further cooling to near-room temperature.

Machine-packed in 50-lb. multiwall paper bags, most of the feed is promptly shipped to feed dealers in northern Wisconsin. Current retail price is about 4 cents a pound.

While use of the dehydrating plant is particularly oriented to alfalfa, it can be put to work on practically any crop in an emergency. For example, two seasons ago when a large amount of corn was not up to canning standards, the dryer converted it into a very acceptable feed.

Waste Spraying Effective

In the past few years we have turned an annoying and costly cannery problem into a near profit. By spraying our waste stream into adjacent fields in a planned pattern we not only have removed an odor nuisance and maintenance chore, but have enriched the land.

Liquid cannery wastes in all three plants are collected in a concrete underground tank and then pumped through lightweight 6-in. aluminum pipe to fields on adjacent farms. Currently 30-acre grass fields are fenced off to receive this application. And these are subdivided into 10-acre plots to receive a length of spray pipe.

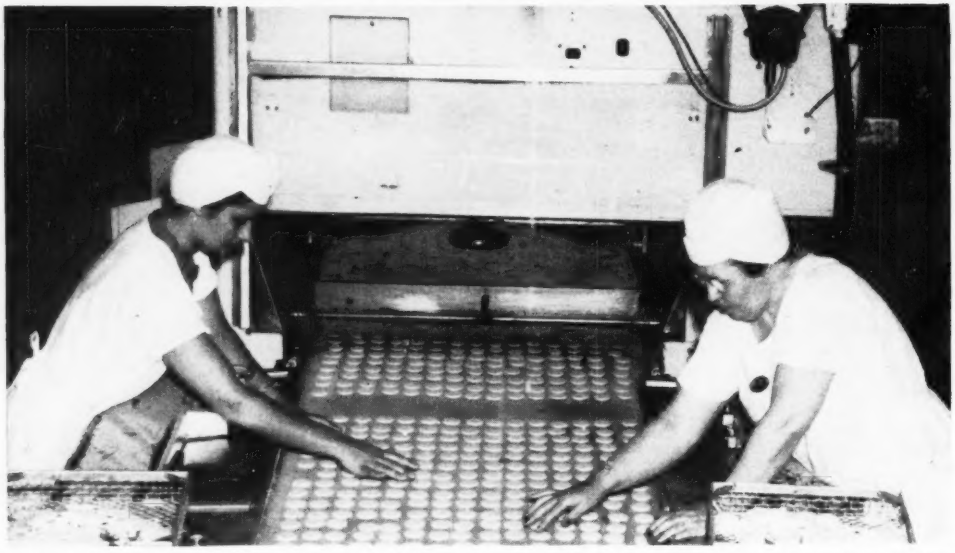
Pipe is joined together with quick-disconnect flanges in 20 ft. sections weighing about 30 lb., so one man can move two pipes at a time. Each morning the branch pipes are moved about 50 ft., which is just about the limit of coverage from rotating spray nozzles.

It is estimated that waste-spraying a 30-acre field in this manner is equivalent to a good commercial application of fertilizer. And the water furnished also is conducive to good vegetative growth. So the most profitable use of the technique appears to be on grazing fields.

Last season at our Oakfield-location beef cattle were fenced into fields which had received a previous spray application and rotated weekly in their grazing. The average gain in weight by these animals during the period was a phenomenal 348 lb. per head.

In another experiment, waste-spray was directed into a wooded area. In this setup, the pipes remained in one location for two weeks, yet the ground showed no signs of saturation. Thus, it appears that nearby woods would be ideal for this system of waste disposal if field application were not convenient or warranted.

Centers are machine-coated . . .



BELT-CONVEYED to conventional machine, candy centers are automatically covered with heat-resisting coating.

COMPOUND COATINGS

Find Versatile Uses in Confections

Available in melting point ranges to suit different climatic conditions, they can be colored, tinted, flavored, or blended with cocoa or chocolate liquor to provide a high variety of candies . . . Handling methods are cited

ALFRED E. LEIGHTON
Consulting Food Chemist, Food & Candy Technologist, Riverdale, N. Y.

Compound coatings have been developed for two purposes—to resist summertime collapse of store-sold confections and to enable coated candies in armed forces rations to withstand tropical climates. They are of good eating quality and have other desirable characteristics.

For the most part, compound coatings are made of hard vegetable fats (hard butters) together with sugar and milk powder. They may also contain chocolate liquor, cocoa powder, or both. As adjuvants, they may have lecithin or other emulsifiers. Flavoring materials are sometimes included.

Broadly speaking, some of these coatings resemble those described under standards of identity for "Sweet Cocoa and Vegetable Other Than Cocoa Fat Coatings." Others are entirely devoid of cocoa powder or chocolate liquor. Or, they may be made with cocoa butter, instead of vegetable butter from non-cocao products. The materials are neutral, or ivory-like, in color when they do not contain cocoa powder or chocolate liquor.

General Uses

For the confectioner, the neutral color of most compound coatings and their mild milk flavor are among the basic characteristics that make them novel. They can be attractively colored and flavored, and thereby be interesting for year-'round use. Those containing chocolate liquor or other cocoa products and vegetable fats of higher melting points than cocoa butter can be used in summertime or for shipment into areas where temperatures are high.

That the items are acquiring a following is evidenced by the fact that some of our large confectioners with multi-store outlets have been using them to round out their assortments. A few pieces of specially colored compound-coated candies, artistically placed in an assortment of candies, increase the package's eye appeal. Some manufacturers have even marketed packages of compound-coated candies attractively colored in assorted pastel shades for the summer months.

There are signs of a trend toward the controlled use of compound coat-

. . . to make attractive color assortment

THE FLAVORSOME mint wafers, in varied hues and made up in a multi-section box, are outstanding in eye appeal.

ings. It will tend to grow because of the specially formulated characteristics of heat resistance and the eye appeal of these coatings. A package can be glamorized with this optical hint that it contains something intriguing.

Another important use for compound coatings—those made with cocoa—is for bulk packaged items (so-called penny goods) for juvenile consumption. In this case, the volume is significantly large, but the profit margin is low. A wholesome chocolate-flavored compound coating for goods in this class permits economies in material costs not otherwise obtainable, while still preserving good eating qualities.

Periodically, the Quartermaster Corps specifies compound coatings for candies that must withstand tropical climates. Use of coatings of appropriate melting point and containing special emulsifiers, such as the Spans and Tweens, is mandatory for concerns that obtain such orders from the QM.

Melting Point of Fats

Climatic conditions that compound coatings must endure vary. The coatings themselves are, therefore, made in different melting point ranges. Selection of the correct product depends upon the temperature that it must withstand, and to a certain but lesser extent on the confection to be coated.

Compound coatings are available with fats that melt in the ranges of 82-93 deg. F., 88-101 F., 91-112 F., and 92-116 F. The latter is intended for candies exposed to specific tropical conditions or high temperatures.

Thus, the candymaker can procure the coating to fit his requirements. Two or more fats from the same maker, but with different melting points, can be blended for intermediate temperature ranges, provided there is not too great a divergence in melting points between the components of such a blend. Generally, the maker of compound coatings can blend more skillfully and successfully than the user. He has the necessary equipment and a better knowledge of fats.

Type of Fats

Depending upon the processing facilities of the edible oil refiner, the following fat products are available for the manufacture of compound coatings: (1) Hydrogenated vegetable fats from one or more plant origins with or without vegetable stearines; (2) cocoa butter without any other type of vegetable fat; and (3) reconstructed fats—those with specially se-

Winning Favor With Confectioners

Every so often, a new tool or material is offered to the candymaker. Some of these prove meritorious, others meritless. Some, after initial trials, steadily gain in favor, others finally languish.

In the case of compound coatings, growing acceptance can now be reported—particularly under impetus of requirements of the Quartermaster Corps, coupled with supporting information uncovered by recent researches at Lehigh University.

Compound coatings are available in melting point ranges to suit a variety of climatic conditions. They are neutral in color or can be tinted and flavored. They can also be formulated with chocolate liquor or cocoa powder to provide coatings for special purposes, economy goods, or prestige assortments. They are not necessarily a seasonal item, but can be used throughout the year in controlled amounts for particular purposes. They can be used in machine coating, hand dipping, and molding processes.

Chocolate refiners and makers are sources of supply for compound coatings. The fats are obtained from refiners of edible oils. A few large candy concerns that make chocolate products from beans are suitably equipped to make their own compound coatings.—*A.E.L.*

lected fatty acids prepared by processes of re- or inter-esterification.

Reconstructed Fats

These fats are relatively new and different in the edible oil industry. Therefore, a brief description of what they are and how they are made is in order.

Natural fats and oils (triglycerides) are combinations of fatty acids with glycerol. Each triglyceride has one molecule of glycerol and three of fatty acid. In a pure triglyceride, each of the three fatty acid molecules has the same chemical identity. However, in natural fats, the triglycerides are mixed. A mixed triglyceride has two, or even all three, molecules of fatty acid as different identities. This makes for complexity and differences in characteristics.

To illustrate the subject graphically, let us examine the following arrangements:

1. Pure triglyceride
   glycerol { #1 fatty acid, #1 fatty acid, #1 fatty acid }
2. Mixed triglyceride
   glycerol { #1 fatty acid, #2 fatty acid, #2 fatty acid }
3. Mixed triglyceride
   glycerol { #1 fatty acid, #2 fatty acid, #3 fatty acid }
4. Mixed triglyceride
   glycerol { #2 fatty acid, #3 fatty acid, #4 fatty acid }

These are only a few of the large number of possible combinations of fatty acids with glycerol. Each numbered fatty acid is indicative of a different identity, each with its own characteristics which pool with the others to make a sort of average in the triglyceride combination.

To complicate the matter still further: In nature, we find mixed triglycerides, such as 2, 3, 4, and others, all existing theoretically in the same natural fat. So any given natural fat or oil represents a sort of average in mixed triglyceride content. Therefore, fats and oils derived from one plant origin will be different from those obtained from another. No two fats found in different plant species are alike.

Tailor-Made Fats

In reconstructing a fat, the triglyceride may be split into its fatty acid and glycerol components. The fatty acids are purified and fractionated or un-mixed and separated into their individual identities. The maker of reconstructed fats can then select from his available fatty acids those that he wants, and discard the rest. The wanted fatty acids with the desirable characteristics, are recombined with glycerol to produce a fat of the maker's own devising.

Up to a point, he can balance his product by fatty acid selection. The resultant product then provides a balance of properties—just the right amount of high and low-melting point constituents for trouble-free use. All constituents are functional, and the fabricated fat will be unlike anything found in a natural combination.

The use of and the relative merits of reconstructed fats in compound coatings, as against hydrogenated fats or mixtures, are a matter of experiment for each user. Each must decide which coating provides the best results in his equipment and enables him to produce items of maximum shelf life.

The actual history of the fat component in a coating is academic. It is the behavior of the coating in an enrober or subsequent process operation or handling that really counts. Shelf life of the finished confection is also of utmost concern.

Handling Compound Coatings

Those compound coatings that do not contain chocolate liquor or cocoa powder can be left neutral or ivory color. Suitable flavors can be incorporated, if desired. Orange, lemon, lime, maple, walnut, butterscotch, coconut, and almond flavors are employed. Colors commonly associated with the flavors are added. The candy centers which are enrobed with compound coatings may also run the gamut of harmonizing flavors. They may include fudge, caramel, jellies, and the like.

Presence of fat and the low moisture content of compound coatings require oil-soluble colors for uniform tinting effects.

Unfortunately, only four FD&C oil-soluble colors are available—two yellows, one orange, and one red. Thus, the number of colors and shades that can be produced in the oil-soluble range is limited to yellow, red, orange, and the lighter pink and yellow shades.

Water-soluble FD&C colors, of which there are a greater variety, can be used with fair success when a suitable emulsifier is employed for blending the watery color solution or paste. Blue, green, wine, and other hues, can be obtained by mixing the colors in solution. Also, a variety of attractive pastel effects can be made.

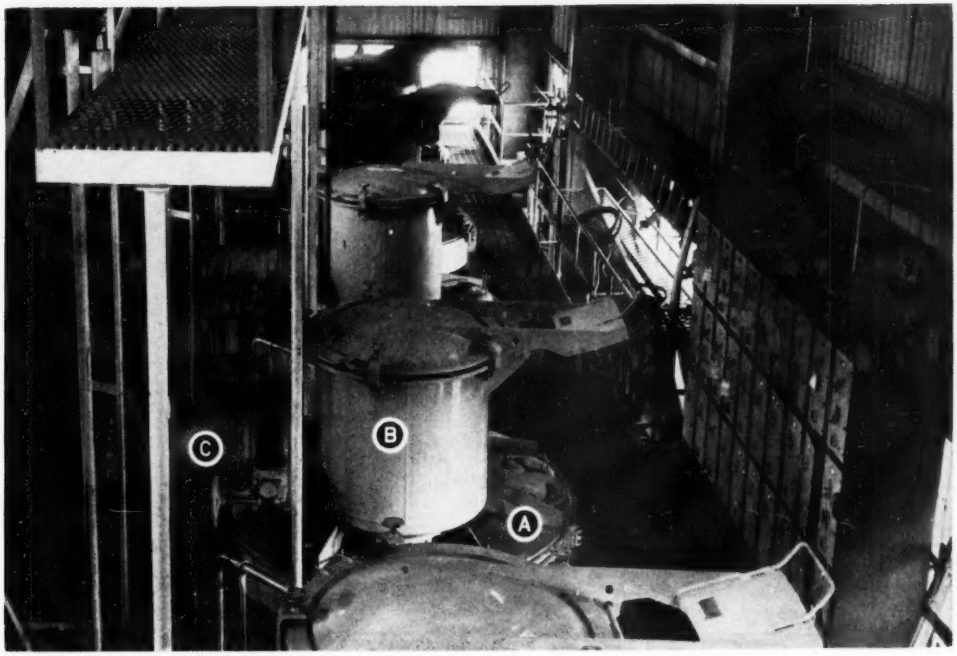
Preparing Colors

To make an oil-soluble color, a weighed amount of certified color is added to sufficient melted vegetable fat or oil in a double boiler to make a 3 percent solution. The mixture is then heated to 185 deg. F. with constant agitation. When the dye is completely dissolved, the solution is strained through a fine mesh sieve and cooled.

If a hard fat is used, the mixture is poured into a tray and allowed to solidify. The slab is then scored into uniform-sized squares for color work. Each cube will tint a given amount of

(*Turn to page 149*)

MIXED sizes and shapes, too. Here, variety appeal of the specially colored compound-coated candies is accented to advantage in tray-style package.



BATTERY OF FIVE product-saving units (plant has ten) is seen above, with the second lettered to illustrate method. Evaporator (A) is topped by new centrifugal separator (B), and thus product entrained in vapors (and formerly lost) is recovered. Separator hooks to condenser (left) by 16-in. line (C).

These Vapor Separators *Cut Concentrate Losses 92%*

After the first three installed chalked up a solid 1/3rd saving, Minute Maid quickly boosted the number to ten—and achieved this top-efficient, "pay-for-itself-in-virtually-no-time" system

W. F. MANTEY
Chief Engineer, Minute Maid Corp., Plymouth, Fla.

Installation of ten centrifugal vapor separators after the evaporators on our company-designed concentrator at Minute Maid has cut the loss of concentrates entrained in vapors fully 92 percent.

And our estimates indicate that the equipment can be accounted as paid for by the value of product recovered within only a four-month running period.

Prior to adding these self-cleaning units, our system was bordering on obsolescence. But now its efficiency is competitive with any system currently in operation in our plants.

Unit Described

Basically, this unit is a single-effect falling-film evaporative system, employing an ammonia refrigeration cycle. Initial vacuum is created by means of a steam ejector and maintained at the proper operating level by condensation of the vapor given up by the evaporation of the orange juice. This concentrator operated at our Plymouth, Fla., plant, includes ten evaporators, and five vapor condensers, in a single-effect system.

Due to the high velocities of vapor leaving the evaporator, a large percentage of carryover of juice and entrained solids was present in the condensate, which should normally contain only a trace of orange oil. We were aware of the costly product loss sustained with the entrained juice lost as carryover.

The problem resisted solution by ordinary methods due to the high velocity—about 34,250 fpm—of the vapor leaving the evaporators. This is equivalent to an exhaust of approximately 11,000 lb. per hr. to the vapor condensers. And any appreci-

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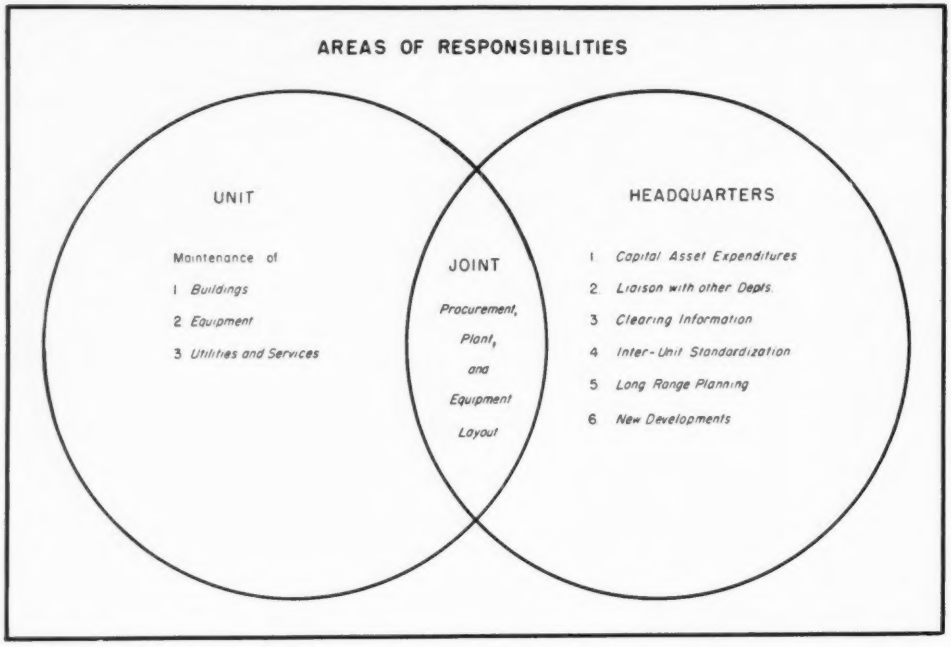


How *Dual-Engineering* Assures

MULTI-PLANT EFFICIENCY

By applying this "Unit-Central" setup, you will stimulate initiative, enthusiasm, responsibility, and cooperation—to form a strong, flexible, productive and enterprising organization

J. G. BROWN
Professional Engineer, New York City

Successful functioning of a multi-plant organization comes down, finally, to the way individual people get along together when working for the common good.

Here, decentralizing of authority makes for initiative, enthusiasm, and responsibility in the units. And intelligent central staff works translates the separate endeavors of scattered units into a smoothly cooperating whole that is much stronger, more flexible, and more productive than the mere sum of all the parts.

A multi-unit food company presents a unique set of problems from the standpoint of organizing its engineering activities. Any attempt at even minimum coordination and standardization between units calls for some sort of central, or headquarters, engineering.

Unit-Central System

Inherent in a dual engineering setup on a unit and headquarters plane are dangers of duplication of effort (with attendant waste) and of "buck-passing" (with resulting indecisiveness and ineffectiveness). Clear-cut assignment of responsibilities is therefore imperative.

The following three-part division, to be discussed later in further detail, is suggested as being workable:

1. Unit (or local)
   a. Building maintenance
   b. Equipment maintenance
   c. Utilities and service maintenance
2. Central (or headquarters)
   a. Capital asset expenditures
   b. Liaison with other departments.
   c. Clearing house for information and data
   d. Inter-unit standardization
   e. Long-range planning
   f. New developments
3. Joint (Unit and Control)
   a. Procurement
   b. Plant and equipment layout

Of most immediate practical importance in the engineering end of a food business is the duty of maintain-

ing workable machinery, sufficiently powered and heated (or cooled), in sound buildings. The condition of equipment, utilities, supply, and of buildings are the direct responsibility of each individual plant engineer, who in turn is directly responsible to the plant manager. No one at a headquarters desk is able to tell when a boiler a thousand miles away needs retubing, or a roof requires immediate repairs after a sudden violent storm.

Organization of the local staff is left to the plant engineer, subject to approval of the plant manager. Headquarters cannot hope to standardize with such a variety of plant conditions. In most cases there is at least one assistant capable of taking over the plant engineer's job in an emergency.

A minimum amount of clerical help must also be provided. A large plant may be able to justify a draftsman and a few junior engineers with special responsibilities. And a *sine qua non* is a capable maintenance foreman, reporting directly to the plant engineer.

The plant engineer is not only expected to keep the wheels turning, but also to do it at reasonable expense. He is therefore allowed a voice in fixing his plant's yearly maintenance budget, and thereafter is held accountable by management for staying close to his estimates. He is concerned with personnel problems related to engineering and maintenance—manning tables, job analyses, testing and training programs, vacations, retirement, and especially overtime and union relations—all from the standpoint of the particular plant conditions.

This also leads him into questions of logistics and supply—the problems of what spare parts, materials, lubricants, etc., are to be stocked, and how their usage and cost can be properly controlled—again, from his own plant viewpoint.

The plant engineering staff is the logical point of contact with local utilities. It is these men who represent the company's interests in a changeover from manufacture to natural gas, or from low to high tension electric service. They, more than any others, must wrestle with the problem of water conservation when a prolonged drought threatens a community.

Implicit in much of the foregoing is the plant engineer's key position in the disaster-control plans of his plant.

Getting Down to Definitions

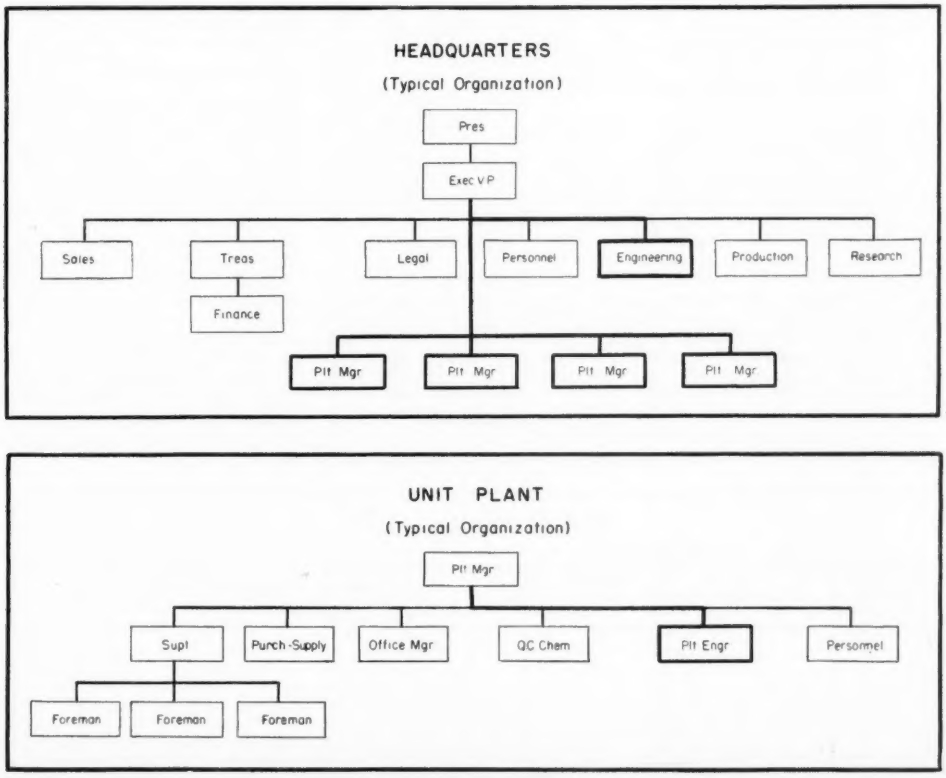
In the broad approach employed here, the overall plant-organization scope includes management's four "M's"—Men, Materials, Money, and Machines. And covered is responsibility for all physical plant facilities—buildings, utilities, machinery, and equipment.

Also, the designation "multi-unit" includes not only "multi-plant"—*i.e.*, different producing locations — but likewise major and well-differentiated divisions of single large plants.

Central's Role

Turning now to the central engineering department, we see that to some extent it exists and functions

Lines of Authority



vis-a-vis top management as the plant engineering department functions with plant management. The department head, who often carries the title of Chief Engineer, is responsible to the operating vice-president, or sometimes the president directly, for all buildings and equipment owned or leased by the company. But the responsibility is on a different plane. For at this point the emphasis is more on "fixed assets".

Top management will rely on headquarters engineering for advice on investment of the company's capital in fixed assets—a matter of great importance because of the relatively long life of machinery and buildings and, therefore, the long-range effects of capital investment on the cash position of the company, the tax picture, competitive position, possible obsolescence, and even labor and public relations.

Usually headquarters engineering has the job of preparing consolidated capital, or fixed asset budgets for periodic top management action. This budget may be prepared on an annual, semi-annual, or even quarterly basis, and it will, of course, be built up of all the items needed by all plants and operations for the specified period.

It is at this juncture that another very important function of the headquarters, or central, branch of the engineering organization becomes evident—that is, its liaison with other departments at the administrative level. Budget-making for capital purchases, for example, must be tied into sales forecasts in order that adequate productive facilities may be provided in time to pick up anticipated increases in volume.

This will frequently involve such matters as which of two or more units should handle the expected new business. Then come the questions on comparative production costs, or the geographical distribution of the sales, which only a central headquarters organization can answer.

Though implicit in the preceding paragraph, it is worth accenting that liaison must be maintained with the central research and development organization. There may often be projects under consideration that will be brought to a commercial stage during the current budget period but which have not yet been finally assigned to a specific unit, or which may not yet be directly translatable into terms of sales estimates.

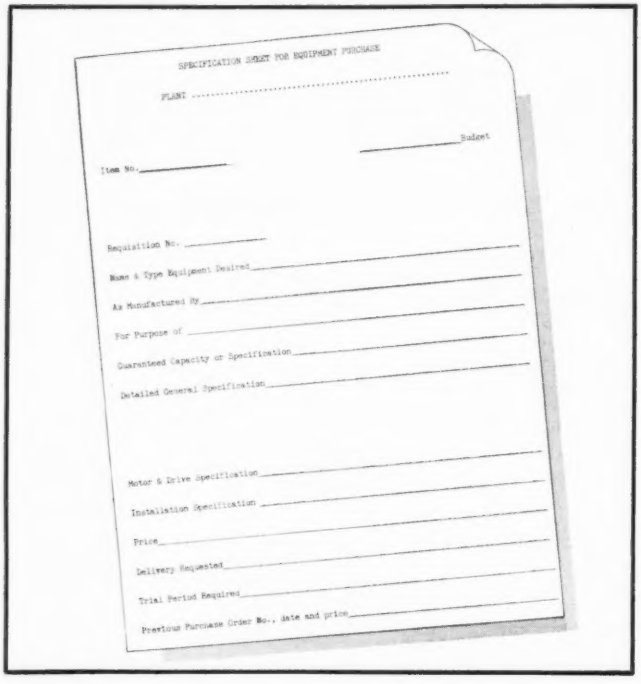
Yet these projects may require future capital expenditures for which some provision (even if on a contingent basis) must be made in the capital asset budget. Here, again, is something that no one unit organization can handle.

Acts as Clearing House

In addition to its No. 1 job of budget-making, with its many ramifications, headquarters engineering must serve the various plants and departments as a central clearing point for certain information vital to the conduct of the business.

One very typical example is the handling of the perpetual problem of "surplus" units and materials. By periodically assembling lists of available surplus equipment from all units on a simple standardized form that provides all the vital information, and circulating these lists throughout the company, headquarters makes possible transfers when advantageous, and also clears all such transfers as well as any sales of capital assets.

Purchase and Inventory Forms



SPECIFICATION SHEET FOR EQUIPMENT PURCHASE

PLANT .....

Budget

Item No.

Requisition No.

Name & Type Equipment Desired

As Manufactured By

For Purpose of

Guaranteed Capacity or Specification

Detailed General Specification

Motor & Drive Specification

Installation Specification

Price

Delivery Requested

Trial Period Required

Previous Purchase Order No., date and price

SURPLUS EQUIPMENT LIST

Plant— *(Name, address)* Date—

Item No	Description	Reason Declared Surplus	Orig Cost	Date Purch	Present Book Val	Condition (Good, Fair, Poor)	Recom'd Disposition	Other Remarks

Another similar clearing function concerns equipment standardization. By reviewing, and maintaining reference files on all major fixed assets purchases, headquarters engineering is able to build up a wealth of experience on applications and performance. This is then available for guidance in making new purchases, whereby good results can be duplicated. And one might as well add in all candor, the occasional unwise purchase can likewise be spotted and thus not repeated.

Benefits Cited

Through standardization of equipment and facilities, the following benefits are gained:

1. Quantity purchases may reduce initial costs.

2. Spare parts inventories can be reduced.

3. In emergencies, equipment or parts may be shifted from one location to another with the assurance that they will fit and do the job.

4. Operating and maintenance personnel gain greater familiarity with the facilities.

5. Processing details, labor requirements, capacities, formulas, and other operating factors, can be more readily compared when units have standardized equipment.

In the type of organization we have been discussing, with headquarters serving the units in an advisory capacity rather than a strictly supervisory one, it is easy to see that standardization will be a slow and gradual process. If one unit is absolutely convinced that it will benefit by not following recommended standards, and if it has reasonable grounds for such belief, then we would say that the principle of standardization may be temporarily waived.

We feel that in such a case, the added experience thus gained is usually worth it. In fact, it is possible that the "non-standard" purchase may end up by becoming the new "standard". Thus, the organization intentionally favors enough flexibility to maintain a vital and dynamic atmosphere, so necessary to success in a field as competitive as food processing.

With respect to long-range planning and the study of new developments, a central organization may be expected to devote a considerably larger proportion of its efforts to these matters than a local unit.

For one thing, the headquarters engineering staff, through its association with other departments, is closer to the planning being done by Research, Sales, Finance, and "top brass", and it can integrate its own engineering expansion (or retrenchment if necessary) into the other planning for a proper overall balance.

Then again, a headquarters organization can often maintain membership for the company as a whole in industry and professional associations, whereby contact can be assured with advanced thinking on food and engineering problems.

Very much the same thing holds true for attendance at national expositions and conferences. It may frequently be uneconomical to assemble personnel from scattered units, and yet be quite feasible to send one staff member to "cover" the event for the benefit of all concerned.

Speaking very generally, the central engineering staff is apt to be located more favorably for rapidly acquiring information on new developments than the units. Frequently, headquarters will be in a metropolitan area, surrounded by the sales offices of its equipment suppliers, and near libraries and universities.

In anything as far-reaching in its effects as engineering, it is quite impossible to maintain absolutely rigid division of responsibilities; for inevitably there are areas of joint concern. One important category is the actual procurement of needed equipment. Obviously, the local unit is deeply concerned with anything it is going to "live with" for a number of years, and it will insist on a voice in preparing the specifications.

On the other hand, central engineering, with its responsibility for proper investment of the company's fixed asset monies and its stake in inter-unit standardization, demands an equal voice. Strange as it may seem, an agreement to handle this very important matter of procurement on a joint basis is perfectly workable.

The local unit establishes its performance requirements, prepares its specifications, and takes bids. Central engineering reserves the right to review the details and to make sure that the proposed expenditure is in line with the approved budget appropriation; also, that it is consistent with experience and policy, as determined by headquarters through its numerous broad contacts.

By this arrangement, no unit is likely to be forced to take equipment it positively does not want, while headquarter's veto power prevents any unit from making a hasty or inadequately investigated purchase.

Comprising a tool for administering such joint responsibility, carefully prepared performance specifications should be mentioned here as being of utmost value in assuring fundamental agreement between local and central engineering staffs on procurement matters.

Of practically equal importance are matters of plant and equipment layouts—and these lend themselves to the same sort of joint treatment. Without maintaining voluminous files in headquarters of all plants' structural drawings, it would be manifestly impractical for central engineering to do complete layout work for the units. The details are best left to the local organization, where dimensions and other data can be field-checked as necessary.

But again, headquarters engineering can often contribute helpful advice and suggestions on reviewing the plans, and the two can thus cooperate to achieve better end results than would either alone.

Handling New Plants

In the case of a completely new plant or very involved process layout, headquarters might take control and even place the project in the hands of an architect or consulting engineering firm to guide it through to satisfactory completion. But the local-unit engineer would still be given opportunity to work closely with the others in setting up detailed plans that would conform to his local conditions, and his familiarity with the latter would be of inestimable value.

Two Specials in Food Plants

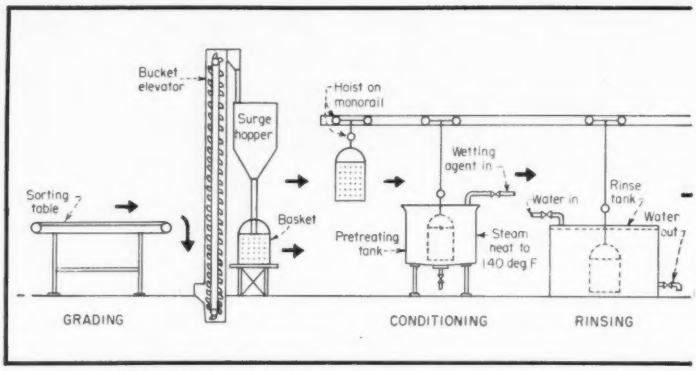
Appropriate at this point is brief mention of two special aspects of food plant engineering—sanitation and safety. Both technically would be included as details of equipment and layout to be agreed upon by both unit and central engineering before acting on new projects.

However, they are both so important that central engineering may tend to stress its "clearing house" function and consult with other headquarters departments, such as Quality Control and Safety, for expert advice in discharging its reviewing functions.

Conversely, the unit engineer may take similar consulting action with his local laboratory, safety man, or union representative. Thus, the best company-wide thinking on these particularly significant matters is assured.

A great deal might be said about line and staff organization, limits of authority, and the like, but individual company difference would render much of it of questionable value for general use. Assuming competent and conscientious engineers in both unit and central engineering offices, and an accepted division of duties, the question of coordination becomes chiefly a matter of that over-worked but still proper term—"communications." In other words, let the right

(Turn to page 211)



HERE'S flowsheet outlining steps in the preparation of salted-in-the-shell

Unshelled Peanuts Now

Latest technique consists of soaking in wetting agent,

A satisfactory method has been developed in our laboratories for salt-impregnating unshelled peanuts prior to roasting.

Employed is a process requiring an edible wetting agent, saturated brine, vacuum, and controlled temperature.

Salting of peanuts in the shell has been practiced for several decades. Two types—salted, boiled, green peanuts; and salted, roasted peanuts—have been frequently available on the market and prepared in the home.

Our investigation, which was prompted by numerous requests for a method of salting peanuts in the shell for subsequent roasting, was directed toward improving the product and extending its usefulness.

Most peanuts roasted in the shell are of the Virginia type. Runners and Spanish varieties are also sometimes thus roasted, and they were included in our experiments.

Initial Tests

First, the three varieties were merely soaked several days in brine. And results showed practically no salt penetration through the shells.

Following further investigations, it was then found that the resistance of the shells to brine penetration could be overcome by soaking the peanuts in a 0.1 percent solution of an edible wetting agent for 15 min. at 140 deg. F.

Temperatures of 145 deg. F., or above, gave the nuts a boiled taste. On the other hand, temperatures below 140 deg. F. resulted in a raw taste. The wetting agent slightly increased penetration at room temperature. However, heating peanuts not previously treated with a wetting agent but submerged in brine was ineffective for salt penetration.

Even after the shells became thoroughly wet and the peanuts were covered with saturated, 140-deg.-F. brine, little penetration into these kernels took place within an hour. However, when the peanuts were pretreated with a wetting agent, submerged in saturated brine, and then subjected two or three times to 20 in. of vacuum for a 5-min. period, sufficient brine was drawn inside the shells.

Process Details

To salt peanuts in the shell by the new method, proceed in the following manner:

1. Soak the peanuts in a 0.1 percent solution of sodium tetraphosphate, or any other suitable edible wetting agent, at 140 deg. F. for 15 min., stirring occasionally.

2. Rinse the nuts, submerge them in a metal container of saturated brine, and then subject them two or three times to 20 in. of vacuum for a 5-min. period. Stir the nuts between each vacuum treatment.

The degree of saltiness may be varied over a wide range by controlling the amount of vacuum and the number of times it is applied. If vacuum is not available, soak the peanuts previously treated with a wetting agent in saturated brine for 1½-2 hr.

3. Rinse the salted peanuts, remove excess brine by centrifuging, and dry 8-12 hr. to a 7 percent moisture content in a 120-130 deg. F. air current having a 200 fpm. velocity. If a centrifuge is not available, spread the peanuts on absorbent cloth or paper.

4. Either roast the peanuts immediately or store them before roasting at 32-38 deg. F. and 70 percent relative humidity. Storage should not exceed 1 yr.

Preference Tests

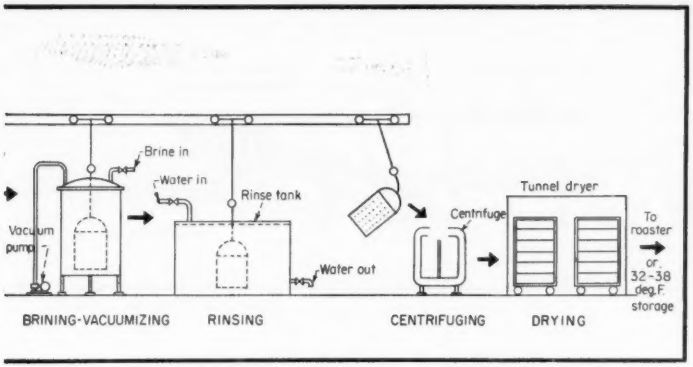
A consumer preference test was carried out with 106 people, ranging from 16 to 60 yr. of age. Salted, roasted Virginia peanuts were preferred over the unsalted nuts by 84 percent of the individuals.

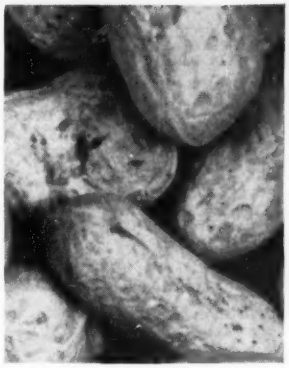
Typical comments of those preferring the salted peanuts were: "There is no comparison between the two; the salted ones are far superior" . . . "Salt and peanuts just seem to go together" . . . "Salt brings out the flavor of the nuts" . . . "After eating the salted peanuts, the unsalted nuts have a very flat taste."

Comments of those preferring the unsalted nuts were: "Not accustomed to salt in this type of peanuts" . . . "Prefer just the nut flavor" . . . "Not enough salt" . . . "Too much salt."

Saltiness of nuts. There was considerable differences in the amount of salt taken up by individual nuts. This

SARA SIEWART and J. G. WOODROOF
Georgia Experiment Station, Experiment, Ga.





peanuts. Dried salted nuts are then roasted to make delectable product.

Salted by New Process

brining under vacuum, rinsing, and then centrifuging

was probably due to the variety of the peanuts, condition of the shells, and maturity of the nuts during harvesting. Differences in saltiness were greater between peanuts of the same than different varieties. However, the Spanish variety picked up salt slightly faster than Runners or Virginias. And nuts with cracked shells absorbed salt faster than those with broken shells.

Mottling of seed coats. When the brine was in contact with the seed coat more than several hours, bleaching and a mottled appearance resulted. This condition occurred more often with damaged shells.

Of the peanuts examined with unbroken shells, 19 percent Virginias and 4.8 percent Spanish were objectionably mottled. But none of the Runners had an undesirable mottled appearance.

Of those with cracked shells, 69.5 percent Virginias, 16 percent Runners, and 35.2 percent Spanish were objectionably mottled.

Hardness of roasted peanuts. Wetting and rapid drying varied the extent of hardening of the seed. Hardening was possibly due to partial denaturization of proteins.

Seed hardening was closely related to mottling of the seed coat—the more severely mottled seed being harder. This was especially true of nuts in which the seed were not fully matured. Hardening was more common with cracked than uncracked nuts. The slight hardening was thought by some on the taste panel to improve the texture by making the shelled nuts more crunchy.

TYPE AND CONDITION of Shells and Resulting Mottling, Saltiness, and Texture of Peanuts Salted in the Shell and Roasted (Approx. 1,660 Peanuts Examined)

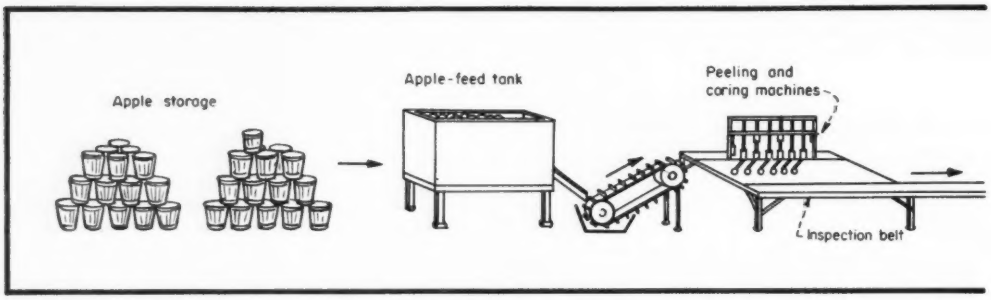
	Unbroken Shells				Broken Shells			
Type	Percent Of Nuts Tested	Mottled* 0–10	Saltiness** 0–10	Hardness*** 0–10	Percent of Nuts Tested	Mottled 0–10	Saltiness 0–10	Hardness 0–10
Virginia	69.5	0	8.5	1.9	13.3	0	7.2	2.3
	4.5	1–2	7.4	1.4	5.0	1.2	6.6	2.4
	7.0	3–4	5.2	1.7	12.2	3–4	8.1	3.1
	8.2	5–6	6.3	1.9	16.9	5–6	7.1	3.9
	5.8	7–8	8.6	3.5	28.0	7–8	8.7	3.8
	5.0	9–10	8.3	5.8	24.6	9–10	9.4	6.1
Runners	95.2	0	6.6	1.5	29.5	0	7.5	1.5
	2.4	1–2	10.0	0	29.5	1–2	7.3	3.0
	2.4	3–4	8.0	5.0	25.0	3–4	8.6	4.5
	0	5–6	...	...	6.9	5–6	9.3	6.0
	0	7–8	...	...	9.1	7–8	9.0	4.5
	0	9–10	...	...	0	9–10	...	...
Spanish	80.0	0	7.1	2.6	45.4	0	9.2	3.7
	10.4	1–2	7.7	3.2	7.4	1–2	9.9	2.9
	4.8	3–4	8.1	4.1	12.0	3–4	8.2	3.9
	4.2	5–6	8.0	6.1	13.9	5–6	7.7	2.6
	6	7–8	10.0	8.0	13.0	7–8	8.8	2.9
	0	9–10	....	...	8.3	9–10	8.7	3.8

* Each peanut shelled and rated 0 for normal color to 10 for complete discoloration.
** Each seed rated 0 for no salt to 10 for optimum saltiness by taste test.
*** Each seed rated 0 for normal texture to 10 for extremely hard by taste panel.

Findings "In a Nutshell"

1. A consumer test revealed an 84 percent preference for peanuts salted in the shell before roasting over the unsalted nuts.
2. Good quality salted-in-the-shell peanuts for roasting can be produced by employing an edible wetting agent and controlled vacuum and temperature.
3. In some instances, mottling of the seed coat and hardening of the seed resulted from the wetting and drying treatments. However, these conditions—seldom noticed by members of the taste panel—did not present a major problem, since most of the damage was confined to imperfectly developed nuts or those with cracked shells. Close grading of the nuts before treatment will virtually eliminate objectionable mottling and hardening due to salting.
4. Saltiness can be controlled by the amount of vacuum employed and the number of times it is applied and released.
5. Salting may be undertaken as a separate operation. Salted nuts can be stored, prior to roasting, as long as the unsalted ones.

The above article is based on the paper, "Salting Peanuts for Roasting," which was published as Technical Paper No. 223, Journal Series of the Georgia Experiment Station, Experiment, Ga.



LINE for making apple fillings for pies. The fruit is first fed from cold storage to peeling-coring machines. Then

Selecting and Processing Apples *For Top-Quality Pies*

PART II—Preparing Them for the Pastries

Spoilage and discoloration must be checked in slices intended for fillings . . . What to watch for in processing, treating, formulating, handling

LOU BISNO
Bakery Chemist and Production Consultant, Burbank, Calif.

In selecting a paring machine, production capacity and simplicity in operation should be considered. Also a unit with stainless steel paring knives and corers should be chosen.

A triple parer has a maximum capacity of 3,600 apples an hour. Due to different sizes of the apples and the human factor (feeding the fruit to the three-cup unit), output in paring and coring varies from 16 to 25 bu. hourly.

Clean removal of seed cells can be attained by merely using a large diameter coring knife or a combination small diameter corer with seed-celler. Practically similar yields were obtained by the writer with a $\frac{3}{4}$-in. corer spoon without a seed celler and a $\frac{5}{8}$-in corer with a seed celler.

From paring machines, peeled and cored apples go onto a conveyor where inspectors trim any blemished fruit. The fruit then continues to an Urchel slicer. Here, the apples are cut into parallel-faced slices, up to $\frac{1}{2}$ in. thick.

If wedge-shape slices are to be produced, an extra operation is required—placing each apple on a spindle feeding the radial slicer. However, this operation can be combined with inspecting and trimming.

Radial-type slicers produce wedges of different sizes—from 14 to 20 per apple. These units are readily interchangeable. Choice of the number of segments will depend upon the size and firmness of the fruit. Small, soft apples should be cut into fewer segments.

In deciding between the two types of slices, other factors should be considered aside from labor costs. Due to their uniformity in thickness, disk-shape slices "compact" more readily than the wedge-shape ones. While pies with wedge-shape slices appear larger, they are not as uniform as those with disk-shape slices. What's more, there is a greater tendency to spoilage by microorganisms with the less compact apple-pie fillings.

Causes for Discoloration

Unless special precautions are taken, apple slices rapidly discolor. Darkening of the slices may be attributed to exposure to air, contact with metal equipment, or contamination.

Tannin in the fruit is the most frequent and troublesome source of discoloration. The amount of tannin differs with the variety of fruit. It also changes for the same variety from crop to crop.

This familiar browning occurs after the apple is cut. It is due to the oxidation of tannins, facilitated by the breakdown of apple tissues together with the release of the enzyme, peroxidase.

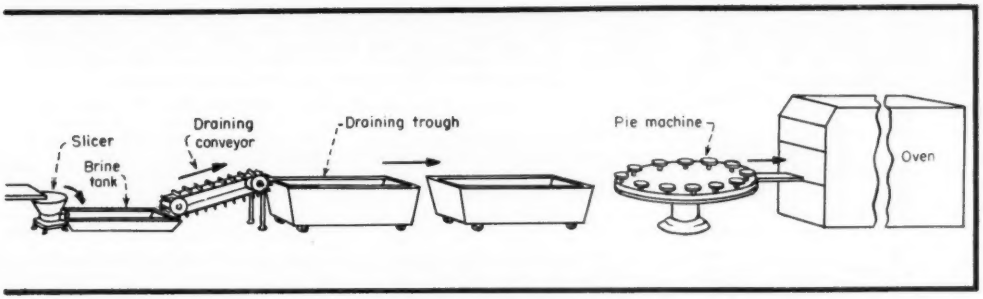
Some discoloration may be nonenzymatic.[6] Frequently, anthocyanin compounds of tin, iron, or aluminum produce a bluish color on the surface of sliced apples.[7] Extremely dark discoloration is attributed to iron con-

A to Z on Fillings

How to assure excellence in apple-pie fillings is detailed in this special two-part article.

Here, in Part II, special emphasis is made on peeling, coring, inspecting, slicing, brining, sugaring, draining, and juicing operations. And prevention of spoilage is also accented.

In Part I ("Getting and Storing the Best," FE Oct., p. 114) ways of procuring and keeping the fruit were covered, with emphasis on proper selection in order to hold down costs yet get greatest yields.



after passing inspection, apples go to slicer, brine-dip tanks, and draining troughs, ready for pies.

tamination, particularly following prolonged exposure of slices to iron-containing equipment. This discoloration is intensified by high pH of either fruit or brine dip.

From a production standpoint, apple pies are of two types—those in which the slices are baked in the pie (with or without sugar and flavoring) or those where the slices are cooked prior to the pie baking.

In the first group, apple pies may be prepared in two ways: (1) Raw, sliced apples, are baked in the pie and a cooked juice is then added; (2) uncooked slices are mixed with sugar or syrup and flavoring and then baked in the pie, without introducing additional ingredients in the baked pie.

As for the second group—cooked filling introduced prior to baking—one method calls for cooking the slices in a syrup, varving in amount and concentration. Employed are sucrose, invert, corn, and dextrose syrups. Mixed syrups may also be used.

Flavor and transparency of the filling will vary according to the concentration and relative amounts of the different sugars. Retention of the original shape of the slices is fostered by the use of late apple varieties, firm-ripe fruit, and syrups of sufficient concentration to prevent disintegration of the slices. Higher sugar concentrations require higher cooking temperatures. Unless cooking is very rapid, flavor losses increase under these conditions.

In a second method, the slices are simply mixed with a cooked and cooled syrup.

If apple-pie fillings which have been cooked in one operation are cooled in tubs holding 100 lb. or more, darkening of the interior 10-12 in. layer of fruit-mix frequently takes place. This is likely to occur if the cooked slices are excessively soft or the sugar concentration in the syrup is insufficient.

Such darkening can be retarded by mixing the apple filling in a cool room. It can also be eliminated by cooling the fruit-mix to room temperature within an hour. A practical method of cooling fruit mixes has been described by the writer.[8]

Flavor of rapidly cooled fillings is superior to those cooled over a long period. There is also greater resistance to mold and yeast growth in precooled fillings than those baked in the pie.

Two general methods are used to inhibit darkening of apple slices: (1) Blanching and (2) dipping in brine or a solution containing one or more reducing agents such as sodium bisulfite and ascorbic acid (with or without citric acid).

True, blanching destroys the enzymes responsible for tannin darkening, but it has an adverse effect upon flavor. Steam-blanching for a short period in a closed container reduces adverse changes attributed to overheating and the loss of soluble material.

Immersion Technique

In the dip method, slices are fed to a stainless steel tank. Here, they are immersed in a salt or reducing-agent solution for 2 min. or longer.

Concentration of salt is 2 to 3 percent. The higher concentration is used where effective color retention is desired, although the flavor is usually superior at the lower level.

Brine concentration and drainage influence the amount of salt retained by the slices. Obviously, proper draining of brine from slices will permit the use of a higher percentage of salt.

SO_2 Treatment

Sodium bisulfite is frequently used instead of, or in addition to, salt. Based upon the amount of brine, the bisulfite should be added to yield 100-3,000 ppm. of SO_2. For fresh sliced apples to be baked within 8-10 hr. after processing, a 2 percent salt solution containing 350 ppm. of SO_2 generally produces good results.

To prepare this solution, dissolve $16\frac{2}{3}$ lb. of salt and $4\frac{1}{2}$ oz. of sodium metabisulfite in 100 gal. of water.

From a flavor standpoint, it is best

PREVENTING discoloration of sliced apples is big problem in pie bakery. Answer is to dip them in brine tank (left), then drain in trough.

to reduce the amount of SO_2 in the dip, omitting it when conditions permit. Comparative tests indicate a superior flavor when slices are dipped in brine rather than a mixture containing salt and bisulfite.

Other compounds suggested are sodium thiosulfite (0.01-0.50 percent), thiourea, and ascorbic and citric acid mix.[1] Practical limitations, however, prevent their widespread use.

If a lot of soft apples is encountered, dipping the slices in brine containing 0.50 percent calcium chloride (on anhydrous basic) or 1.38 present calcium lactate will firm them so that they can bake longer.[2]

Brining Details

Based on a sliced-apple output of 40 bu. per hr. for two triple paring machines and a 100-gal. brine tank, approximate ratio of slices to brine is 1.5 to 1.0. Thus, there is a perceptible change in the composition of the brine every few hours.

If, at the start of the run, the pH of brine is 7.0 and the pH of the slices is 3.0, the pH of the brine will gradually drop. Not only that, dissolved apple solids and the number of microorganisms will increase.

To obtain uniform results, citric acid should be added to reduce the pH of the brine to 3.0-3.5. Lowering of the pH, of course, will depend upon the acidity desired in the slices.

As the amount of brine is reduced by evaporation and carry-over into the fruit, adjustments should be periodically made from a reserve tank. In addition, the brine-dip tank should be drained every 2-3 hr., cleaned, and filled with a fresh solution.

Draining brine from the slices is accomplished by a perforated stainless steel bucket conveyor and specially designed apple troughs. In feeding the slices from dip tank to trough, most of the brine is drained from the fruit. Any brine remaining on the slices drains through a perforated stainless rack mounted 6 in. above the bottom of each trough.

Juice drained from the slices in the apple troughs are drawn off periodically or continuously. In the latter case, a quick opening valve is opened, and the juice flows through a stainless trough into a cooling tank, or through cooling coil. In either case, temperature of the juice is reduced to 50 deg. F.

The amount of juice drained from the sugared slices varies according to the variety and condition of the apples, amount of added sugar, shape and size of the slices, extent of mixing of sugar and fruit, and the draining period.

If several apple varieties are used—particularly a mixture of long-keepers of one crop and summer apples of the following—then differences in their composition and properties will affect the flavor, baking characteristic, and keeping quality of the pie.

Several varieties of raw apples, when ground and held at 80 deg. F., differ in their resistance to fermentation and mold growth. Variations in this respect can also be observed in one variety and at different stages of maturity. As the fruit approaches optimum ripeness, there is less tendency to spoilage. Beyond this point, the fruit readily spoils.

When a mixed variety of sugared slices is drained, the juice will vary in composition, particularly pH and sugar content. This variation, of course, will depend upon the proportion of the different varieties. Also, when this juice is cooled and introduced into baked pies, the occurrence of mold growth and fermentation will vary according to the pH and sugar content of the juice.

Depending upon variety and maturity, variations in the baking of the individual slices will also affect their tendency to spoilage. Fully baked slices are more stable in this respect.

Factors Affecting Stability

Aside from having uniform apples, there are other factors that influence the stability of the pie filling. Important are: (1) Temperatures at which the apples are used and the sugared slices are drained, (2) use of left-over sugared slices, (3) amount and distribution of the prepared juice in the baked pies, and (4) humidity of the bakeshop.

If, for example, long-keepers are withdrawn from a 32-deg. F. storage room and used with a new crop of apples (70-80 F.), naturally there will be variations in the temperatures of the apples and drained juice.

Now suppose that both type of slices are baked in a pie. If the long-keepers are fully baked, then the early variety will be over-baked. Moreover, the latter slices will disintegrate and boil out. Furthermore, the pie will stick to the baking plate.

Tendency of drained juices to ferment or support mold growth will depend upon composition, time, temperature, and exposure to contamination. So besides control of apple variety, temperature and sanitation are of prime importance.

The effect of temperature on fermentation of drained juice is pronounced. Juice held at room temperature will ferment within 8 or 10 hr.

Fermentation of Juice

Development of acidity at about 90 deg. F. is pronounced. In experiments carried out by the writer, the acidity of a juice held 24 hr. at 95 deg. F. was 50 percent higher than one kept at 50 deg. F. for the same length of time. After a definite holding time, acidity of slices at the top of an apple trough was greater than those at the bottom.

When sugared slices are held over for one day without refrigeration, fermentation may proceed to such an extent that even the baked, juiced pie may rapidly spoil. In cases where acetic acid is formed, such spoilage is usually associated with slices or a mixture of slices and juice which have been exposed several days before use.

Occasionally, pies held several hours before baking—particularly at elevated temperatures—develop sufficient acetic acid to be perceptible in odor and flavor. This condition is aggravated under a combination of two circumstances—using left-over apples and holding the unbaked pies for several hours at high temperatures.

Let us now consider how formula and production methods influence the quality of apple pies. Use of good flavored apples at the proper stage of maturity results in a pie that is highly saleable. Such apples are also easy to handle and bake.

Raw material costs may, in many cases, be reduced, and processing simplified, by properly grading the apples and withdrawing them from storage in good condition.

One of the greatest difficulties in the production of an apple pie with good flavor is the use of excessive amounts of bisulfite in the brine-treatment of slices. In this case, flavor is sacrificed at the expense of producing light-colored slices.

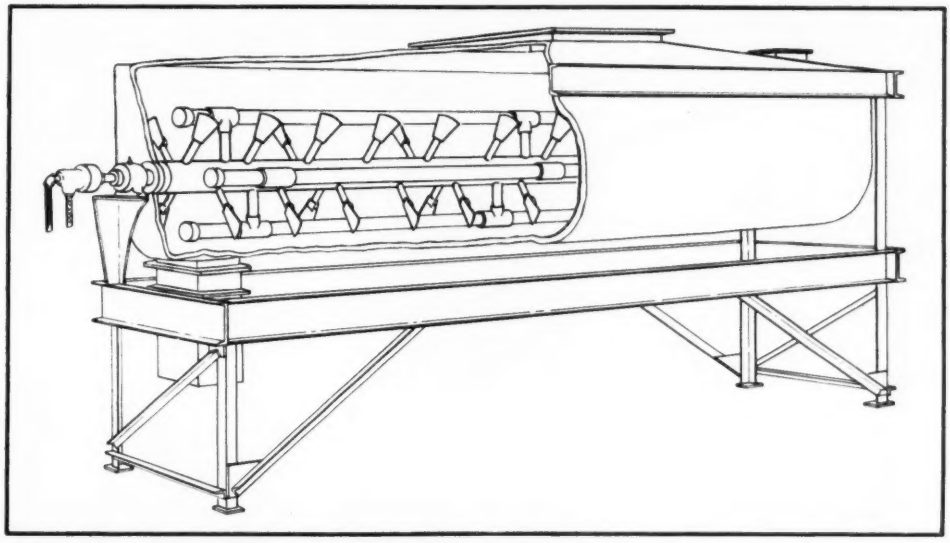
(Turn to page 151)

TABLE IV*—CONCENTRATIONS of Acids—When Used Alone or in Combination With Sugars—Required to Prevent Growth of Saccharomyces Cerevisiae

	Acid Alone (Percent)	pH	Acid With Sugars: Acid (Percent)	Sucrose (Percent)	Dextrose (Percent)	Fructose (Percent)
Acetic	0.525	3.25	0.375	55.0	40.0	40.0
Citric	12.250	1.70	2.450	50.0	45.0	30.0
Lactic	3.600	2.20	2.700	35.0	20.0	20.0

* Tables I to III appear in Part I of this article (FE Oct., p 114).

NEW EQUIPMENT & SUPPLIES



New Compact Dryer Has Many Uses

Performed by a new compact dryer are three functions—economical drying, cooling, and a new means of obtaining byproducts and recovering solvents.

Called Monotube, it operates on the conduction principle of heat transfer. There are no air currents through the material bed. Dusting is stated to be practically abolished, and it is possible to dry materials having fine particles which readily become airborne. It is stated that materials as light and fluffy as cake flour can be dried successfully.

Dryer is made in two trough diameters—24-in. (lengths from 5 to 10 ft.) and 30-in. (lengths from 5 to 20 ft.)

There is only one moving part: A paddle conveyor (on a hollow shaft) which turns in a U-shaped trough.

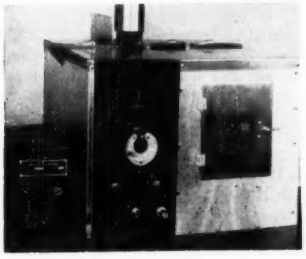
Steam, hot liquid, or coolant circulates through the shaft and outrigger tubes for efficient transfer of heat as material is churned and conveyed through trough. There is constant agitation for uniform drying without overheating.

Dryer is termed effective in treating wide variety of food and vegetable oil mill products and many other materials. And it is said to operate equally well on high or low temperatures.

It can be used for products which must be dried at temperatures above or below that of steam—merely by employing another medium, such as hot water for lower temperatures and hot oil or other liquid for higher temperatures. It can also serve as a cooler by using water, refrigerants, or other cooling media. It is by the process of condensation that this dryer extracts byproducts and solvents otherwise lost in processing. Solvent in the wet solids is carried out of dryer by warm air and cooled beyond the dew point. Where highly sanitary conditions are required, dryer can be fabricated of special metals, such as Monel or stainless steel. Precise heat control maintained with unit makes it suitable for efficient roasting of food products.—*Link-Belt Co., 307 N. Michigan Ave., Chicago 1.*

Circle 115A on Reader Service Card

Check-Weighs Packages On Production Line



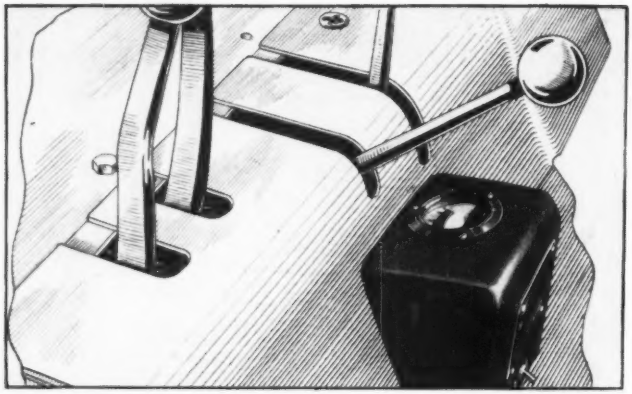
Fast and accurate check-weighing of packages on the production line is claimed with use of this instrument.

Model features novel "pick-up and take-away" mechanism which is stated to essentially duplicate hand method of placing packages on the scale. Cycling is reported easily synchronized with standard conveyors having relatively high speeds.

Weight sensing is accomplished by electronic means resulting in improved accuracies for this type of production weighing. It rejects pieces or packages on over and under weights based on tolerance ranges which are adjustable, and which may be kept to close limits of standard. Standards may vary from milligrams to pounds, and of practically unlimited physical size. —*H. A. Hadley Associates, Inc., 41 Barlow St., Winooski, Vt.*

Circle 115B on Reader Service Card

New Charge-Indicator Ups Truck Battery Economy



Greater efficiency and economy with industrial truck batteries is reported possible with use of new and improved charge indicator.

Instrument can be easily mounted so that operator can see dial at all times, thus giving him readings on state of battery charge while truck is working. Easy-to-read, three-colored dial indicates whether battery is "full", "1/2", "empty", or in "danger". Changing batteries as soon as they register "empty" prevents repeated overdischarge which cuts battery life.

Indicator, a Wheatstone bridge-type instrument, is readily adjustable for 3, 6, 12, 15, 18, and 24-cell batteries; a series of resistors and taps permits the desired adjustment. Unit is completely enclosed in metal case finished in black, crackle enamel. Meter is balanced to read accurately regardless of its mounting or truck's position. A toggle switch disconnects indicator from battery during charge. —*Gould National Batteries, Inc., Trenton 7, N. J.*

Circle 116A on Reader Service Card

Industrial Cleaner Is Light, Portable

This new model light-weight industrial vacuum cleaner has a redesigned tank with a full 5-gal. capacity.

Named the MCV-205B, it is designed for small and intermediate operations. Machine is easily moved about—on a rubber ball bearing swivel caster and two fixed rubber wheels—simply by pulling on the hose.

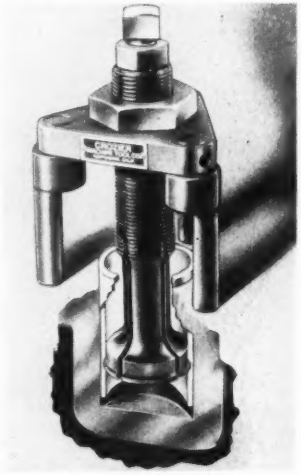
It weighs 36 lb. and can be carried by handle on top. A $\frac{3}{8}$ hp. 115 v. universal ac. or dc. motor powers the machine, which moves air at the rate of 108 cfm. It has a water lift of 52 in.

Standard equipment includes: Flexible vac hose, 8 ft. long, $1\frac{1}{4}$ in. dia.; two piece curved wand; fabric type filter; 12 in. floating brush floor tool; 9 in. brush; 5 in. upholstery tool and a flat fibre nozzle.

Included in wet pickup kit as extra equipment and shown at left of unit, is a glass wool filter, two filter refill discs and a 9 in. squeegee tool.—*Multi-Clean Products, Inc., 2277 Ford Parkway, St. Paul 1, Minn.*

Circle 116B on Reader Service Card

Bushings Come Out Fast With Use of New Tool



Savings in labor as high as 75 percent have been reported with use of this new tool for removing bushings, bearings and sleeves from blind holes.

New extractor, maker states, eliminates necessity of machining bearings, minimizes hazard of injuring casings, and curtails excessive dismantling of equipment.

Unit consists of eight threaded expanding arbors, a draw table with two sets of legs—short and long and adjustable to distance from work. It can handle any hole from $\frac{1}{2}$ to 2 in. dia. A maximum of $2\frac{1}{2}$ in. may be drawn at one setting, and press fits of over 5 tons have been extracted readily with this unit. Adjustability of set eliminates need of stocking many sizes of pulls, thus reducing inventory.—*Crozier Machine Tool Co., 684 N. Prairie Ave., Hawthorne, Calif.*

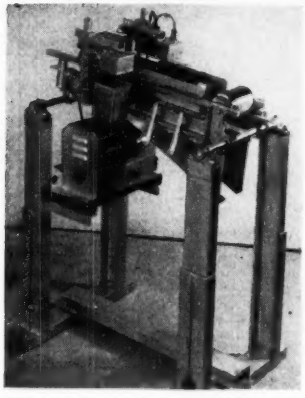
Circle 116C on Reader Service Card

Tripods Ease Handling Of Conveyor Sections

These new tripod supports provide quick and easy movement of conveyor sections. Equipped with 3 in. hard rubber casters, they move easily over factory floors. Conveyor does not require bolting to stand, hence can be quickly set up. They are available in three models: Small, medium, large. Special stands can be supplied for odd height adjustments.—*Speedways Conveyors, Inc., 1263 Niagara St., Buffalo 13.*

Circle 117A on Reader Service Card

Imperfectly Labeled Cans Rejected at High Speed



This high speed, electronic machine, the I-T Robot, instantly rejects imperfectly-labeled cans.

In operation, cans may travel through the machine bead to bead and the unit still drops only the undesirable ones out of the line. It handles as many as 800 to 1,000 cans per min.

A photo electric eye scans the cans as they pass, detecting any flags or dog ears sticking up from the labels. A feeler finger system touches each label both top and bottom to see that it is on straight and in proper position. Feeler fingers may be adjusted to ride any desired distance from edge of can.

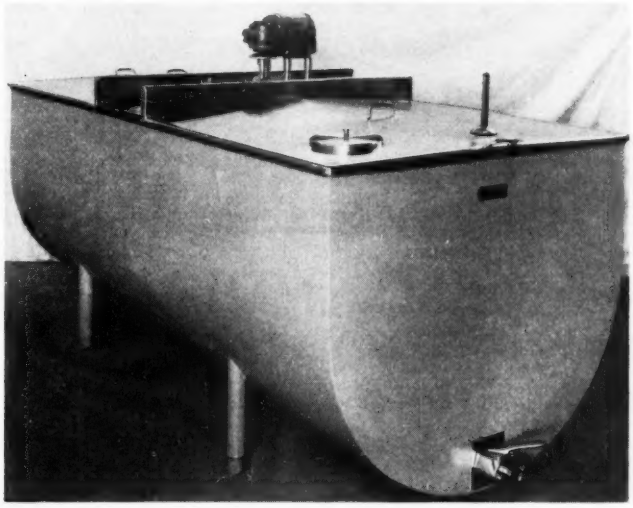
The cans roll by gravity down a track past the eye and fingers. When the feeler system contacts metal, indicating a labeling flaw, it actuates a solenoid which instantly opens a fin-shaped gate in the track through which the can drops. Gate immediately closes again to permit passage of next can through line.

Rejected can drops onto a track below and is generally returned to labeling machine operator.

Unit comes in two models. One is adjustable to all size cans from 211 x 304 to 404 x 708. The other is adjustable for baby food-size cans. The machine weighs 171 lb., uses 110v. a.c.—*Illumi Tronic Engineering Co., 680 E. Taylor St., Sunnydale, Calif.*

Circle 117B on Reader Service Card

Bulk-Milk Tank Ups Quality, Economical Too



Higher quality milk and operating advantages in dairy plant receiving rooms are reported with use of this bulk handling, refrigerated tank on the farm.

Rectangular shape minimizes space requirements. Bottom is rounded and pitched to end outlet. Cover is two piece uninsulated stainless steel. Legs are adjustable with unexposed threads. Tank is built low for ease of dumping milk when strainer is used.

Inside lining is all-welded stainless steel. Entire unit is easily cleaned. Center bridge is provided for an agitator. Propeller-type removable agitator with sanitary coupling is employed.

Automatic milk temperature control for use in starting and stopping the compressor is standard equipment. Direct expansion cooling method is used.

Tanks are utilized as follows:

Immediately after milking, milk is poured through a strainer directly into the holding tank. This tank, being refrigerated and equipped with an agitator, speedily cools the milk. Procedure permits combining evening and next morning milk in same tank.

A farm pick-up tank truck is used to transport milk from individual refrigerated farm tanks to the plant. When this truck arrives at the farm, driver measures milk in the tank. A record of the contents is kept by the driver and farmer. After thoroughly agitating the milk, a butterfat sample is taken, both for the plant and farmer.

The milk is then pumped through a hose from farm tank to truck. Hose and pump are part of the pickup truck equipment. Efficient, fast cooling of milk, together with action of the agitator are given as principal reasons for improved quality.—*Damrow Bros. Co., 198 Western Ave., Fond du Lac, Wisc.*

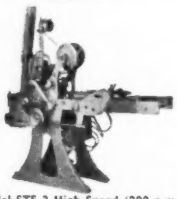
Circle 117C on Reader Service Card

IT'S MULTI-PACKING
in Cellophane . . .

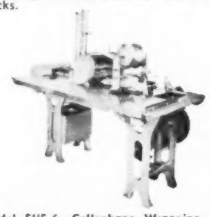
THAT STOPS SHOPPERS...

and it's SCANDIA
FOR FASTER, LOWER COST
MULTI-PACKS

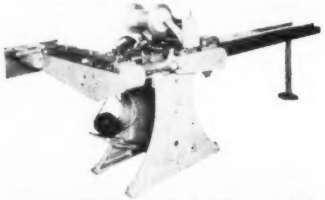
Transparent cellophane wrappings or multiple packages get most sales out of least display space. They're the thing today. And the best way to multi-pack the widest variety of differently shaped packages is the Scandia way. There are Scandia semi-automatic and fully automatic machines that are multi-packing goods like the above at the rate of 100 a minute and think nothing of it. What's more—no cardboard base, 30% less cellophane, and no scorching or "cooking" of goods by heat-sealing! Space provides a long list of products now Scandia multi-packed, or of the line of Scandia Machines. If you want to increase sales through lower cost and better Multi-packing, just write Scandia today. This is a new field, so you better get expert advice from engineers who know!



#1 Model STS-3 High Speed (200 p.m.) Cellophane Wrapping Machine used for small Multiple-Packs.



#2 Model SUS-6, Cellophane Wrapping Machine used for developing new Multiple-Packs (Available on rental basis).



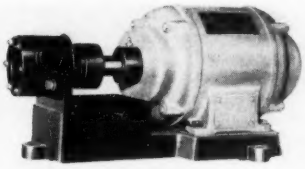
#3 Model SFS-6 Medium Speed (100 p.m.) Cellophane Wrapping Machine used for larger Multiple-Packs.

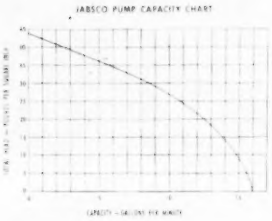
SCANDIA MEANS MODERN *Multi-Packing*

Manufacturing Company

500 BELLEVILLE TURNPIKE,
NORTH ARLINGTON, N. J.

Neoprene Rubber Pump Handles Corrosive Liquids





This flexible Neoprene impeller pump is now available in hard rubber construction for handling acids, alkalis, and other corrosives.

Pumps ¾-in. outlet delivers 15 gpm. at 22 ft. head, or 5 gpm. at 72 ft. head. Maximum capacities are 95 ft. head or 16 gpm. It pumps either viscous or thin liquids.

Self priming, the pump will start instantly against suction lifts of 6 ft. without a foot valve. When primed, it will handle suction lifts as high as 14 ft.

Self-lubricated flexible Neoprene impeller is also self compensating for wear. Impeller can be replaced quickly by simply removing the cover plate.

Pump can operate equally well in either direction. Motor is ½ hp., 1,140 rpm., polyphase, close-coupled, with the impeller mounted directly over the Hastelloy motor shaft.

Corrosion-resistant hard rubber is used in the molded casing, cover plate, gland parts, and drip pan. Base is cast iron painted with acid-resistant paint. Mounting bolts and studs are stainless steel. Shaft, impeller insert and key are made of Hastelloy C.—*American Hard Rubber Co., 93 Worth St., New York City 13.*

Circle 119A on Reader Service Card

Bare-Lamp Luminaire Is Easily Installed

Announced is a new bare-lamp luminaire series, type BB, for general lighting.

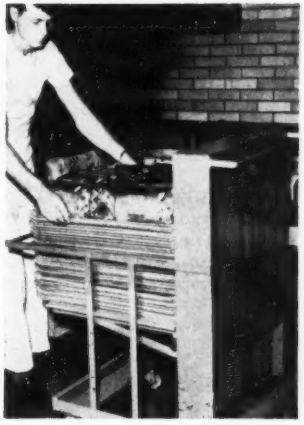
New fixture is for use with two 40w. standard fluorescents or with two 38, 58, or 75w. slimline fluorescents.

Company states simple design cuts purchase price and adds trim appearance. Ease of installation has been provided by a swiveled socket assembly and by a connector, for use when mounting in rows.

Fixture is equipped with lead-lag fluorescent ballast reported to have all economy features of the series ballast but assuring full-rated lamp life and simple maintenance.—*Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa.*

Circle 119B on Reader Service Card

Adjustable Dispenser Speeds, Eases Work



Production is speeded and worker's task made easier with use of Loweator-Dispenser in the bakery. Unit is readily moved about and is adjustable to varying heights.

Termed especially suitable for pans, peel boards and icing trays, these handling units, powered by a simple, calibrated spring mechanism, keep supplies at convenient working level. Level is maintained whether unit is fully loaded, half-filled or nearly empty. Supplies are easily re-loaded from the top and fined their proper level automatically.

Units eliminate stooping, bending and lifting. Accident factor is reduced and employee morale improved because operators are able to maintain pace of machine operation with minimum effort.—*Bakery Div., American Machine & Foundry Co., 511 Fifth Avenue, New York City 17.*

Circle 119C on Reader Service Card

Want More Information?

It's free—and easy to get. Simply note here the items on which you want more details, then circle each key number (there's one given at the bottom of each item) on the handy Reader Service postcard just inside the back cover. Then sign at the bottom and mail. No postage is needed.

For your convenience, too, all items in this department are listed and keyed in the Reader Service Section.

Let us pour you a sample of this homogenized emulsifier

This is Myverol® Distilled Monoglyceride homogenized with nitrogen to produce a wholesome, smooth-flowing white cream that retains its uniformity.

The monoester content of this emulsifier is 90%, as compared with the 40% common in ordinary commercial monoglycerides. And there's no question about its wholesomeness for use in such food products as baked goods, shortening, margarine, peanut butter, dessert topping, and others.

Myverol Distilled Monoglycerides are prepared from natural fats and oils, then concentrated by molecular distillation. This means they're low in diglycerides and impurities that inhibit emulsification or degrade product taste.

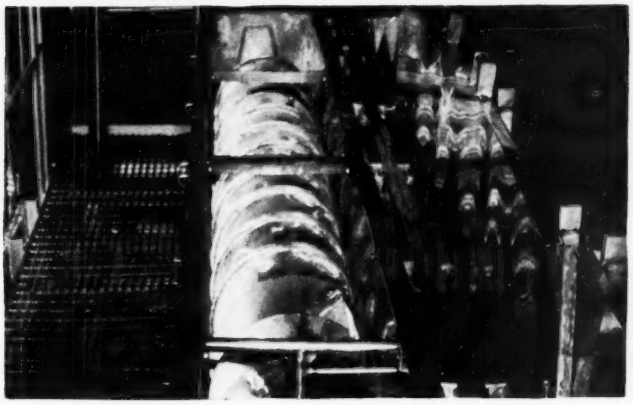
Let us send you a sample for your investigation. Write, wire, or phone ***Distillation Products Industries,*** 723 Ridge Road West, Rochester 3, N. Y. (Division of Eastman Kodak Company). Sales offices: New York and Chicago • W. M. Gillies and Company, Los Angeles and San Francisco • Charles Albert Smith Limited, Montreal and Toronto.

distillers of monoglycerides from natural fats and oils

Also . . . vitamins A and E . . . high vacuum equipment

DPi

Stainless, Hollow Screw Conveyor Has Many Uses



Sanitary design marks this new screw conveyor which can be used as a blancher, heat exchanger, cooling unit and blancher-supplement.

Known as Model TLH Thermascrew, it is made of stainless steel, with all contact welds ground smooth. Unit is completely accessible for cleaning after each run. Cover, seals, bearings and construction details are designed to meet sanitation requirements.

Equipment consists of hollow screw mounted in a trough. Live steam jets through bottom and side of trough are provided at intervals along its length. Steam, hot water, cold water, or brine is circulated through the hollow screw for indirect heating or cooling, combining operations of a live steam blancher and heat exchanger.

When live steam can be used for blanching, the steam is admitted through the trough jets.

By using the hollow screw alone, relatively high heat transfer rates have been obtained with no burning on the heated screw. This use provides a true heat exchanger.

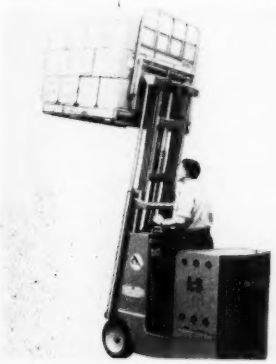
Circulation of cold water or brine through the hollow screw alone provides cooling for whole fruit, slices, thick or thin slurries and other products.

In some operations, use of the hollow screw to supplement live steam blanching has actually reduced need for addition of condensate to product.

Thermascrew is available in lengths and diameters to handle specific capacities. Units may be installed in series or parallel. Slow-speed operation of screw provides gentle handling of products. One unit is reported processing mushrooms successfully.—*Rietz Manufacturing Co., 150 Todd Road, Santa Rosa, Calif.*

Circle 121A on Reader Service Card

Single Lever Controls Truck's Movements



Speed, direction and braking are accomplished with one master control lever on the newly designed Space Master electric fork truck.

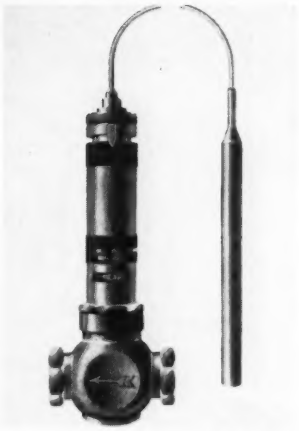
Operator has a choice of four speeds forward or reverse and with incorporation of magnetic controls he can throw master lever into full speed forward and get a smooth, automatically timed acceleration through each speed. It is not necessary to stop lever at each speed stop. Truck can be run all day at any one of speeds selected.

Furthermore, operator can go from full (or any) speed forward to full (or any) speed reverse with one quick flick of lever. Deceleration forward through neutral and into acceleration reverse are all controlled by magnetic timing.

Most interesting feature is dynamic braking which means that operator can decelerate and stop his truck without use of his mechanical brake. Dynamic braking is accomplished via control lever in driver's hand. This feature eliminates the continual off-again-on-again foot brake operation.—*Lewis-Shepard Products, Dept. R-1, Watertown, Mass.*

Circle 121B on Reader Service Card

Temperature Regulators Are Easily Replaced



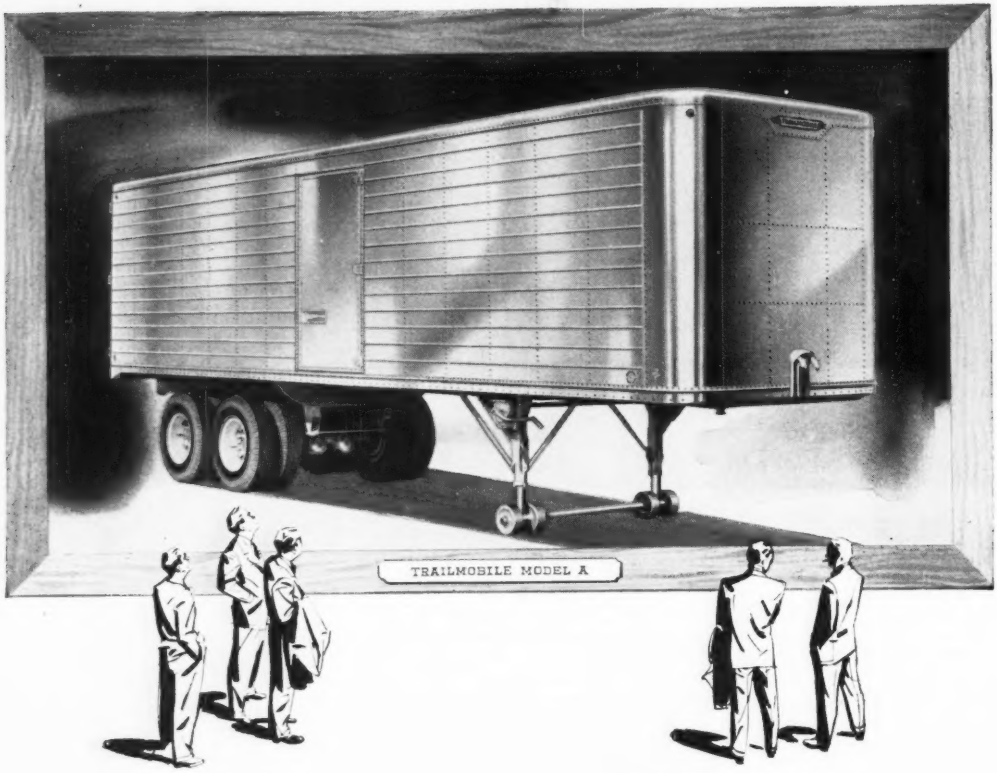
Announced is new line of self-operated temperature regulators known as Series V.

Designed in either direct or reverse acting types for heating and cooling applications, they can be employed to handle—through the valves—steam, liquids, gases and all fluids not corrosive to brass.

Regulators operate on the simple principle of liquid expansion. Since liquid expansion is proportional to increments of temperature, the valve movement is gradual. Result is termed a gentle, but positive, throttling where the valve supplies only enough steam or cooling medium to maintain desired control temperature.

Features reported for the regulators are: Simple, rugged, field-replaceable thermostatic system—easily, quickly replaced without removing valve from piping system; tight shut-off; overload protection; dial adjustment; and reduced maintenance. The 1/2 in. regulator is approximately 8¼ in. overall.

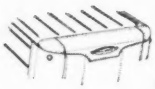
Available in sizes ranging from ¼ to 4 in., regulators will control tem-



A *Sound* idea for moving more food at lower cost!

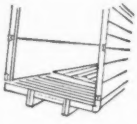
Every day more and more Trailmobiles are being used to haul America's food . . . from farm, to factory, to store. And every day food men discover more reasons why it *costs less* to move food products in lightweight, aluminum Model "A" Trailmobiles. Stripped of revenue-stealing dead weight, they are easier to pull, easier to maintain. New design features increase payload by as much as 15%! This model is also available as a refrigerated unit. Get all the facts about these new, money-making aluminum trailers by writing on your company letterhead—*today*.

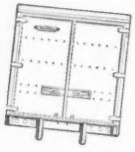
TRAILMOBILE FEATURES FOOD MEN LIKE!



New squared front design. Short radius corners provide extra payload space at the front end. Full 90" inside width increases payload as much as 15%.

Floors take heavy lift-trucks. Edge grain fir floors have bolsters on 12" centers to handle lift trucks with axle loads as high as 10,500 pounds.





Improved weather-proof doors. Recessed, pressure-type door latches seal out dirt and water. Individual locks permit the opening of one door at a time.

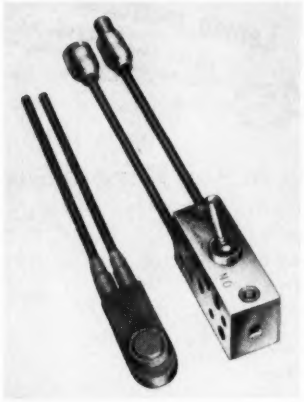
The Trend is to TRAILMOBILE

TRAILMOBILE INC.
Subsidiary of Pullman Incorporated
Cincinnati 9, Ohio • Berkeley 10, California
Friendly Sales and Service from Coast to Coast

peratures between 25 and 275 deg. F., with a 50 deg. F. range of adjustment. Inlet pressure limit is 125 psig. and inlet temperature limit 450 deg. F. They are constructed with bronze bodies, renewable bronze or stainless steel seats and disks.—*Farris Stacon Corp., 516 Commercial Ave., Palisades Park, N. J.*

Circle 121C on Reader Service Card

New Waterproof Switch Is Shock Resistant



Basic mechanism that operates this waterproof switch is a new type of over-center snap-action motion formed by means of a flat strip of berrylium copper punched into the shape of a sine curve.

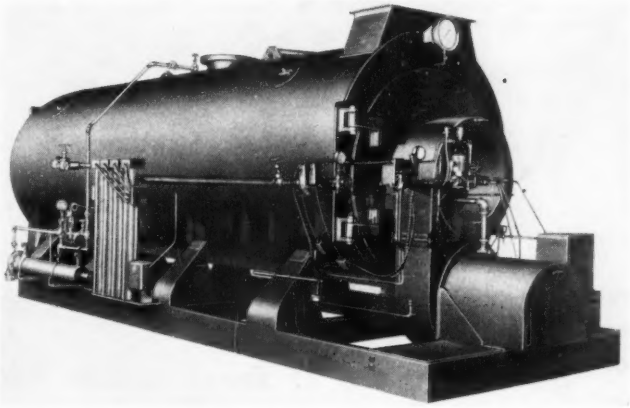
This curve mechanism is stressed longitudinally which causes the two loops of the sine curve to form themselves into opposite helixes. An outstanding characteristic of switch is its ability to resist shocks. Contact is in the middle of two supported ends of the over-center mechanism.

Unit illustrated is enclosed in a silicone cover completely sealing the switch from moisture and dirt as well as making it explosion proof and waterproof. As silicone will withstand temperature extremes, actual tests indicate that switch will operate well at −65 or +165 deg. F.

Switch can be made up in many styles including single pole-single throw or double pole-double throw toggle and push button types of mechanisms. Switch is rated at 20 amps. resistive load 28v. d.c. and 10 amps. lamp load. 28v. d.c. A.c. rating on request.—*Control Products Inc., Harrison, N. J.*

Circle 123A on Reader Service Card

Packaged Steam Unit Has High Heat-Transfer



Through the principle of cyclonic combustion, this packaged steam generator is claimed to produce a maximum of heat transfer. Design calls for 3 sq. ft. of heater surface per boiler hp.

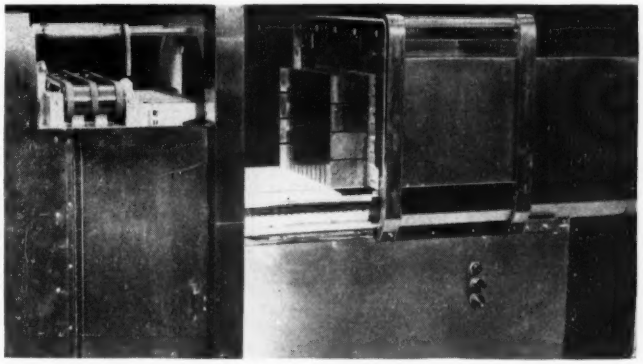
In operation, air enters combustion chamber at high velocity, and mixing with fuel, it is made to spiral in a vortex along entire length of furnace. Intense flame transfers heat to fire tube both by radiation and convection.

Generator meets all state requirements and is built in accordance with ASME and National Board of Standards. It has label of Underwriters Lab.

Full power operation from a cold start in 15 to 20 min. is reported attained. And maintenance is termed low. Designed for oil or gas fuels, boilers range from 18 through 500 hp., 15 to 200 lb. operating pressure.—*Cyclotherm, Div. United States Radiator Corp., Oswego, N. Y.*

Circle 123B on Reader Service Card

Cuts 40-lb. Cheese Block Into Forty 1-lb. Pieces



In less than a minute, this new automatic machine cuts a 40-lb. block of cheese into 40 pieces, 1-lb. each. Further, the machine can be easily adjusted for ¼-, ½-, or ¾-lb. units.

In operation, when a block has been placed in the machine and a transparent plastic sliding door closed, the cheese is pushed through a series of cutting wires. Specially designed mounts are reported to eliminate deformation of the wires and minimize wire breakage.

After cheese is cut, individual blocks are elevated to a conveyor which carries them out of the machine. The 1-lb. blocks are automatically positioned onto the in-feed conveyor of an over-wrap machine.

Weight of the individual pieces is

even if you're baking for Giants,

you can do it best with GAS

says ALLAN YOUNGSMA of SAGE'S in San Bernardino

Most bakers won't come face-to-face with a commission such as the National Orange Show Committee handed Sage's Complete Markets at San Bernardino, California. But Allan Youngsma, Manager of the Baking Department did the job in one of the bakery's standard GAS ovens and he tells about it this way—

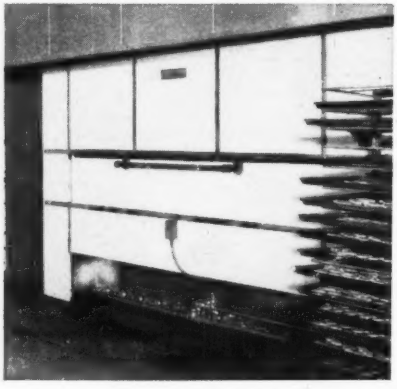
"When I first heard the dimensions my head reeled. However, I realized that I could depend on our GAS Ovens, even though I knew we had never called on them to do such a tremendous job before. Believe me, only the accurate temperature control of GAS, and the ruggedness and adaptability of our Gas Ovens made such a feat possible. *And the products were very good indeed.*"

MORE AND MORE
THE TREND IS TO GAS
FOR COMMERCIAL BAKING

Above: Allan Youngsma *(right)* and Lee Early who decorated the cake. At right is the Gas-Fired Dalton Revolving Oven in which baking was done.

If you'd like to have a list of the ingredients of these giant baked products, we'll be glad to send it. But if you want the best advice on Modern Gas Equipment for every normal baking requirement, just call in your Gas Company Representative.

AMERICAN GAS ASSOCIATION
420 LEXINGTON AVE., NEW YORK 17, N.Y.



accurate within ⅛ oz. tolerance. Variable speed drives provide a range of from 20 to 55 lb. per minute.

Worker's safety has been safeguarded through special switches, no exposed mechanism, and a start-stop safety door.

Machine is termed sanitary throughout. Stainless steel and white neoprene belts are only materials that touch product.

Dimensions are: Height 53½ in.; width 32 in.; and length 73¼ in.—*T.A.B. Engineers, Inc., 767 Milwaukee Ave., Chicago 22.*

Circle 123C on Reader Service Card

Tray-Cart Combination Speeds, Eases Handling

Economies in handling large quantities of bread and other bakery goods are claimed for system employing collapsible cart and wire trays.

This tray and cart combination, maker states, speeds handling and minimizes damaged goods delivered to retail counters. Cart holds eight trays spaced 6 in. apart. When trays are removed, cart can be folded flat for compact storage or for stowing in delivery truck. To meet individual requirements, size of trays and spacing between them can be varied. Tray dimensions range from 17 to 25 in. in width and from 20 to 30 in. in length.

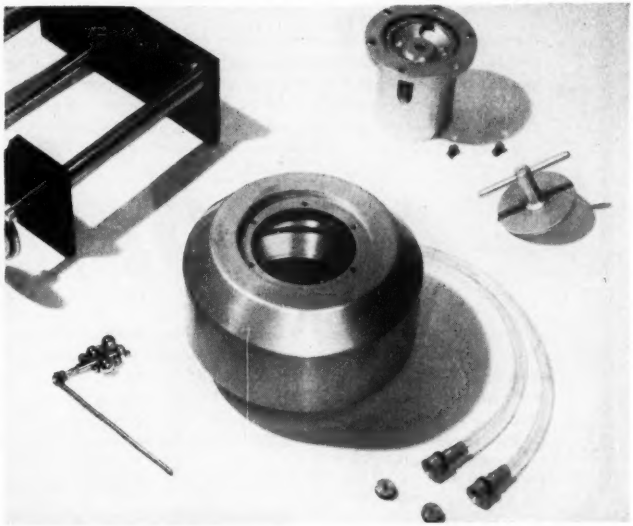
When delivery trucks are modified by installation of simple angle-iron racks to accommodate new flat trays, their load capacity is said to be increased by 50 percent. Cart facilitates handling of trays from truck to retail island and also permits temporary storage in back room, thereby reducing number of delivery trips. In addition, maker states tray's nesting feature permits complete unloading of truck in 3 min. or less at end of delivery run.

Constructed of wire and sheet metal, trays are termed durable and long-lasting, yet weigh only few ounces. They nest three to 1 in. and require minimum space when stacked empty. Users report loss factor with these metal trays to be only about 3 percent annually.

Cart incorporates welded tubular steel frame construction and can be supplied with galvanized or painted finish. Weighing only 33 lb. and equipped with two wheels, it can be easily moved up and down stairs as well as on level surfaces. Cart measures 50 in. in overall height.—*Coleman Div. Fanner Metal Products Co., 2172 S. Clair Ave., Cleveland 14.*

Circle 125A on Reader Service Card

Ultracentrifuge Has New Bowl-Type Rotor



Batch samples as large as 1,600 ml. can be ultracentrifuged up to 20,000 rpm. under controlled temperature conditions in a new bowl-type rotor designed for use with the Spinco Model L Preparative ultracentrifuge. At this speed, material is subjected to maximum and minimum centrifugal forces of 43,380 and 16,770 times gravity, respectively.

The rotor (illustrated) has been designed to speed up preparative runs on sedimenting materials that pack readily — particularly those forming gelatinous precipitates—and it lends itself to materials that require sterile handling. The rotor is so designed that all parts can be readily knocked down and removed, thereby permitting thorough sterilization.

Rotor consists of (1) the main bowl with two internal grooves dimensioned for efficient material packing and for easy resuspension of the packed materials, (2) a removable central core that prevents sloshing, minimizing unbalance and stir-back, and (3) a lid-handle assembly.

The core includes two filling holes with plugs. Here plastic tubing can be attached for easily controlled discharge of supernatant fluid.

Packed sediment is extracted with a plastic scraper or resuspended by the use of stainless steel balls and a motor-driven rolling fixture, which is an accessory. To facilitate recentrifuging after this operation, a magnet is supplied for withdrawing the balls without removing the center core.

Weighing approximately 22 lb. loaded, new rotor accelerates to 20,000 rpm. maximum routine operating speed, in 9 min.—*Specialized Instrument Corp., 646 O'Neill Ave., Belmont, Calif.*

Circle 125B on Reader Service Card

NOW... While you can...

MECHANIZE! MODERNIZE!

Your Packaging Line

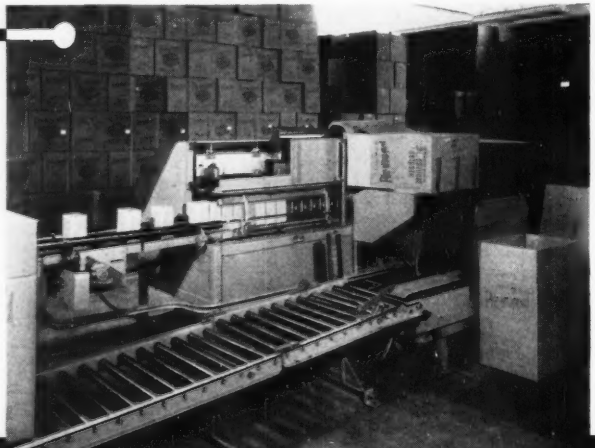
Modern, mechanized packaging — *from production line to shipping platform* — is as essential today to successful packaged-goods merchandising as is an eye-catching, interest-arousing, sales-stimulating and purchase-provoking package.

In fact—in many PACKOMATIC equipped plants—the savings resulting from mechanization are making possible more attractive packages . . . contributing to a competitive edge, price-wise . . . and having a healthy effect on earnings.

PACKOMATIC

T.M. REG. U.S. PAT. OFF.

Regardless of the phase of packaging with which you are primarily concerned—whether you be consultant, designer, sales or production executive—you will find it worthwhile to read or listen to the PACKOMATIC STORY as it has been developed over the past three decades of working with the world's foremost packaged goods manufacturers. Cartons or shipping cases—single or multiple units—ounces to POUNDS—garden seeds or power mowers, PACKOMATIC experience includes them all. Your inquiry incurs no obligation.



*P*ictured is one of three semi-automatic tiering-type shipping case loaders in plant of Personal Products Corporation, Chicago, Illinois. This handles from 180 to 600 containers per hour with only one attendant to place opened container blanks onto loading horn.

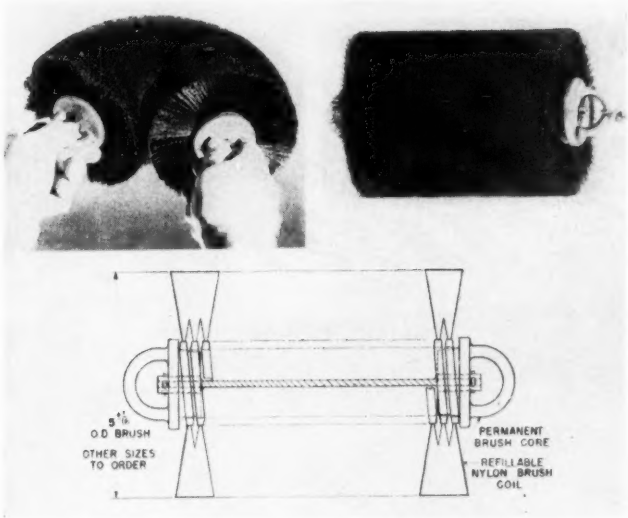
There's a wide range of *standard* PACKOMATIC packaging machinery to help you—shipping case loaders (packers); sealers, imprinters; carton forming, filling and sealing machinery; volumetric fillers, dating and coding devices; paper can tube equipment.

Take a page from the experience of today's leading manufacturers of packaged products—QUAKER OATS, BALLARD & BALLARD, COLGATE, ARMOUR, CONVERTED RICE, INC., and a host of others where PACKOMATIC packaging machinery is saving time, labor, floor space, money.

J. L. FERGUSON COMPANY
Rt. 52 & Republic Avenue, Joliet, Illinois

CHICAGO • NEW YORK • SAN FRANCISCO • LOS ANGELES • SEATTLE • TAMPA
NEW ORLEANS • BOSTON • BALTIMORE • CLEVELAND • DENVER • PORTLAND

Flexible Brush Cleans Ducts, Spouts



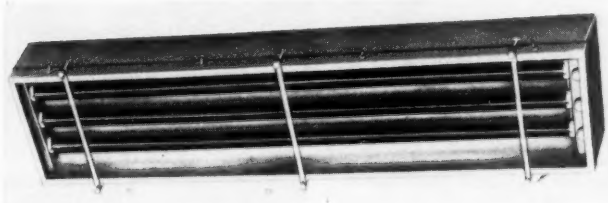
Weevils, spiders, cobwebs and dirt are reported thoroughly removed from ducts with this new brush.

Completely flexible, this cleaning tool passes through bends of more than 90 deg. It can be weighted and lowered by one man or centered on a long cord and drawn back and forth by two men. Filler material, easily sterilized, may be medium nylon, extra stiff nylon or phosphor bronze wire.

Construction consists of a continuous coil with brush material, said to be shedproof, loop-anchored in a plated steel channel. Coil is easily removed from permanent core for cleaning or replacement purposes by removing a cotter pin. Available in any size to fit user's requirements, brush may be round, square or rectangular.—*Fuller Brush Co., 3653 Main St., Hartford 2, Conn.*

Circle 127A on Reader Service Card

Ultra-Violet Unit Covers Large Area



This new industrial-type Blak-Ray Model XXX-40 covers an area of 20 to 40 sq. ft. with intense (non-injurious) long wave ultra-violet radiation.

Fixture is dust-proof and vapor-proof, with a spectral-finish aluminum reflector for maximum ultra-violet intensity. Three 40w. tubes are used which are made of a new self-filtering glass that increases the fluorescent response to the point where inspection operations can be handled in a normally lighted area.

Tubes are rated at 3,000 hr., they burn cool, start instantly ,and may be turned on and off at will with no warm-up period for reaching peak ultra-violet emission and no cooling-off period required before re-starting the units.

Principle of this type inspection is based upon fact that many substances, when activated by ultra-violet energy, emit a visible glow which is called fluorescence. Observation of the color, intensity, and area of this fluorescence enables observer to make qualitative and quantitative determinations of materials being inspected. One of many applications of units in food plants is to detect decay and fungus growth in agricultural products.—*Ultra-Violet Products, Inc., 145 Pasadena Ave., South Pasadena, Calif.*

Circle 127B on Reader Service Card

Stainless Vacuum Kettle Has Special Agitator

This new, 250-gal. stainless steel vacuum kettle is equipped with a single-motion stainless steel agitator.

Featured in unit is special agitator bearing in dome that permits shaft to extend from overhead motor down into kettle without use of step-bearings inside. Thus an absolute vacuum can be maintained at all times.

Completely equipped with vacuum condenser, motor driven pump, vacuum gage and breaker, the unit is steam jacketed and is made under ASME Code for working pressures up to 100 psi. Jacket is also equipped for water cooling.

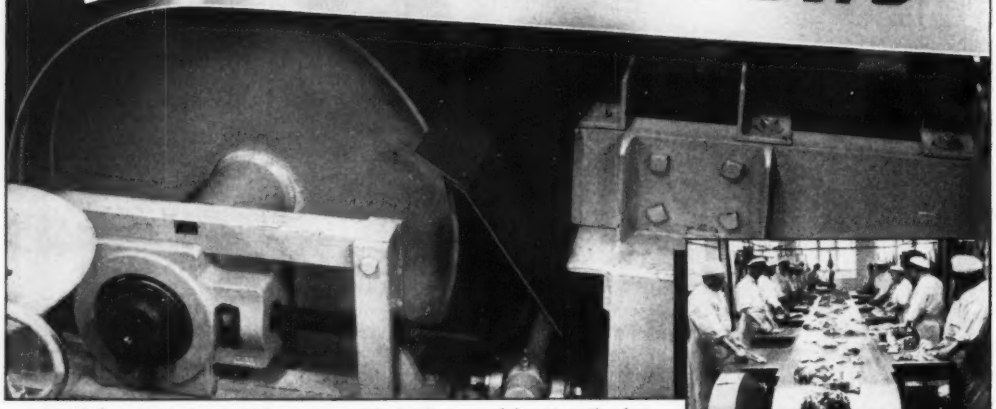
To left of kettle is 3 in. product feed connection and valve. At bottom is a 3 in. outlet valve. Inside of kettle is easily accessible for cleaning through large manhole visible on upper dome. This manhole has a glass viewer.

Particular kettle was designed for re-concentration of tomato puree from 40 to 28 percent. Its design and construction lends itself to cooking of many other food products.—*Hamilton Cooper & Brass Works, Div. of Brighton Copper Works, Inc., Cincinnati, Ohio.*

Circle 127C on Reader Service Card

See the ANSWER TO YOUR FOOD CONVEYING PROBLEM in this surface?

SANDVIK STEEL-BELT CONVEYORS



An eight-foot wide Sandvik steel-belt conveyor used for handling cans of shortening. The plant where this conveyor is installed has experienced up to 25 years of satisfactory service from an earlier Sandvik conveyor installation.

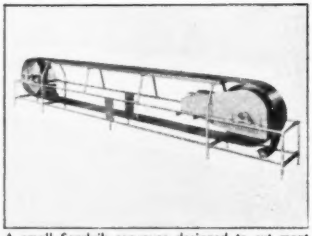
Sandvik steel-belt conveying work table makes cutting up of dressed hogs a continuous production line operation.

The smooth, impervious, easy-to-clean surface of Sandvik steel-belt conveyors has improved processing of a wide variety of foods. Here are some reasons why:

The conveying band provides a continuous, unbroken flat surface of stainless or carbon steel. — Live steam or boiling water can be applied directly. — Steel scrapers can be used for cleaning or discharge. — Withstands baking or drying temperatures. — No taste contamination. Smoothness facilitates slide handling (a vital advantage for can conveying). — High load capacity. — Long service life. — Belts can be of any length or width.

COOLING ARRANGEMENT—Sandvik conveyors can be built with a patented water-bed arrangement which cools from beneath . . . no water gets on top of the band. You can cool and convey, regulate thickness while cooling, cool and strip off gelatinous materials in sheet form, cool loose and pulverized materials, cool solids in sheet form and cool materials in layers.

ENGINEERING HELP—Sandvik's engineering department will be glad to work with you in designing a conveyor to fit your operation. Sandvik has had over thirty years of experience in designing conveyors to operate either as independent units or as integral parts of special processing equipment.



A small Sandvik conveyor designed to cut meat handling costs.

Write, wire or phone for further information.

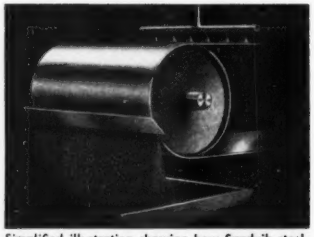
SANDVIK STEEL BELT CONVEYORS

SS-B5

SANDVIK STEEL, INC., *Conveyor Division*

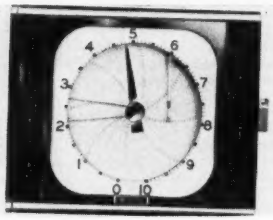
111 Eighth Avenue, New York 11, N. Y., WAtkins 9-7180

Manufacturers of Steel Belt Conveyors for Over Thirty Years.



Simplified illustration showing how Sandvik steel-belt was used in a continuous vacuum drier for soluble coffee. Scraper blade removes crystallized coffee from band.

Round-Chart Recorders Are Fast, Accurate



Announcement is made of the addition of round-chart recorders and automatic controllers to line of electronic Dynamaster potentiometers and bridge instruments.

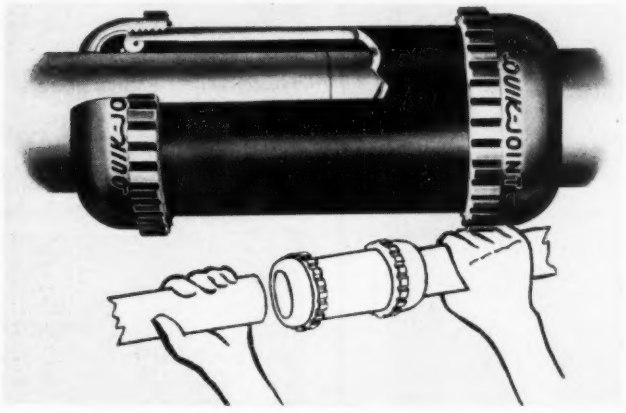
New models are accurate, high-speed, continuous-balance, null-type electronic instruments which can be used to measure any variable that can be translated into an electrical quantity such as dc. current, dc. voltage, capacitance, or resistance. Typical sensing elements that can be used with the instruments include thermocouples, resistance thermometer bulbs, pH amplifiers, and smoke density detectors.

Measured variable is recorded on 12-in. dia. chart and indicated on large circular scale, legible at a distance. Models are offered for full-scale pen travel in 7, 3, 1½, or ¾ sec., and with a wide variety of ranges. Controlling models with all types of air and electric action are available.

Recording mechanism is on front of hinged aluminum alloy panel, which can be swung out to gain easy access to electronic components. Instruments are housed in moisture, fume, and dustproof case suitable for wall, flush-panel, or front-of-panel mounting.—*The Bristol Co., Waterbury 20, Conn.*

Circle 129A on Reader Service Card

Coupling Speeds, Simplifies Pipe Work



In less than 60 sec., this factory assembled coupling, according to reports, can be installed in any piping system. No thread cutting whatever is required with use of unit, know as Quik-Joint.

Pipes to be connected are simply inserted into ends of coupling body and lock nuts wrenched to desired tightness. Result is a tightly sealed but flexible joint capable of withstanding working pressures mounting up as high as 2,000 psi.

No castings are used; the body is of pressure-tested pipe steel having greater wall thickness than pipe to be joined. Lock nuts and gasket retainers are drawn from cold rolled steel. The compression rubber gasket comes in a number of formulae depending upon desired application.

Units are available in sizes from ½ to 1½ in. I.P.S. as straight coupling, 90 deg. and 45 deg. ells, welded and threaded adapters. Special lengths and bends to specification also available.—*Quik-Joint Manufacturing Co., 469 E. 158th St., Harvey, Ill.*

Circle 129B on Reader Service Card

New Bushing Simplifies Mounting of Sheave

Quick and easy installation or removal of the "Vari-Pitch" sheave and mounting on the shaft so that adjusting control mechanism is either toward the motor bearing or away from it is now possible with a new type of "Magic-Grip" bushing.

New bushing consists of two split-tapered sheaves, one within the other. When drawn together with locking screw, bushing sleeve is contracted on shaft and outer sheave sleeve is expanded against discs simultaneously to effectively lock entire mechanism with all working clearances eliminated.

All torque is transmitted by keys in two sleeves so that stresses due to starting, stopping or sudden overloads will not affect sheave setting in any way. Spacing of discs to produce different pitch diameters is accomplished with adjustment screw.

Design permits sheave to be installed on motor shaft with adjusting screws either away from or toward motor bearing. Ability to control sheave from motor bearing side is termed a decided advantage particularly on machines where low hanging frames or close quarters make it difficult to use type sheave which must be adjusted at outer end. Controlling mechanism can now be located where it will be the most convenient.—*Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.*

Circle 129C on Reader Service Card

Temperature Controller Covers Wide Range

Operating temperatures ranging from −100 to +600 deg. F. are accurately controlled by a newly designed instrument using resistance bulb sensitive elements.

Known as Thermo Electronic it is

HOLD pH VALUE AUTOMATICALLY

Hundreds of food plants use Bristol Automatic pH Controllers and Recorders to hold pH at the value known to produce the best results.

In many processes pH has a marked effect on the product. When automatically controlled, time, money and materials are saved, and a more uniform quality product results.

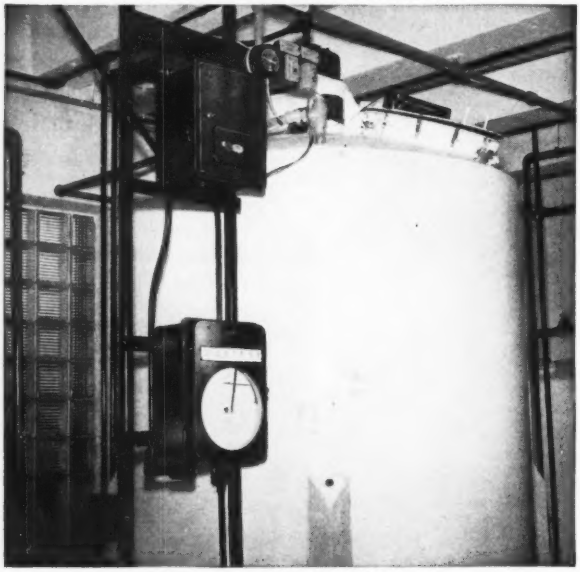
In plant water treatment, for example, the control of pH at very definite values is almost an absolute necessity for proper operation of coagulation, neutralization, softening, and ion exchange processes.

In sugar refining, automatic regulation of liming of raw cane juice maintains pH at the value that produces proper clarification.

In manufacturing gelatine, pH must be carefully controlled to obtain a product with the desired solubility, viscosity, clarity, and jelly strength.

Control of pH is also an important factor in efficient neutralization of excess acidity or alkalinity of waste before disposal.

Write for bulletins covering pH instruments and the other Bristol Food Plant Instruments listed to the right. THE BRISTOL COMPANY, 115 Bristol Road, Waterbury 20, Conn.



Typical installation of Bristol pH Instruments

FROM COAST TO COAST MANUFACTURERS OF

Bakery Products
Beverages
Canned and Preserved Products
Cereals
Coffee
Confectionery
Corn, Potato, and Root Starch Products
Dairy and Milk Products
Edible Oils
Flavoring Extracts, Food Colors, etc.
Gelatine
Grain Products
Meat Packers
Sugar
Syrup and Molasses
Vinegar and Cider
Vitamins
Yeast

USE THESE BRISTOL INSTRUMENTS

Automatic Control Instruments – including electric, pneumatic, and time-program controllers,
Recording Instruments, and
Telemetering Instruments

TO MEASURE AND CONTROL

Absolute Pressure
Current
Draft
Flow of Fluids in Pipes
Humidity
Liquid and Water Level Recorders
Mechanical Operation and Motion
pH Value
Power
Pressure
Running and Down Time and Running Count
Speed of Travel and Rotation
Temperature (including thermometers, pyrometers, and potentiometers)
Time in Process
Vacuum
Voltage

FOR BETTER QUALITY AND LOWER COSTS IN

Air Conditioning
Baking
Blanching for Canning
Cooking and Boiling
Drying
Electric Equipment and Plant Distribution Systems
Evaporating, Condensing, Distilling
Fermenting
Flow of Liquids, Solutions, Steam, and Gases
Heat Exchanging
Heating, Cooling
Mixing, Kneading, Blending, Emulsifying, Homogenizing
Pasteurizing
Plant Waste Disposal
Product and Materials Handling
Refrigeration
Roasting
Steam Generation and Distribution
Sterilizing
Water Supply

BRISTOL

AUTOMATIC CONTROLLING, RECORDING AND TELEMETERING INSTRUMENTS

built with single or duplex control action, and available in six different temperature ranges. Instrument has a relay with load contacts for operating heating elements, motor starters, electric valves, and signal contacts for the two red and green lights on the instrument door. These signal lights are boldly visible over a wide angle at distances up to 100 ft.

When temperature at resistance bulb deviates as little as 0.1 deg. F. from control point setting, instrument takes immediate corrective action.

Calibration of measuring circuit is stated accurate within plus/minus 0.25 percent of scale range. This accuracy is maintained by stabilized manganin wire resistors. Variations of ac voltage or variations in resistance of connecting cable from bulb to instrument do not impair calibration accuracy. Circuit is immune to electrical interference from induction heaters, spot welders. Relay chatter is eliminated by lock-up circuits.

Standard vacuum tubes are used in the electronic circuit. Controllers are suitable for flush panel or wall mounting, require no leveling, and need not be mounted in a vertical position.—*Thermo Electric Co., Inc., Fair Lawn, N. J.*

Circle 129D on Reader Service Card

New Chemicals

Filtering, Sifting Sheets Now Made of Teflon

Perforated tape and sheets of the inert resin product, Teflon, are now available for filtering and sifting corrosive chemicals, and other materials, without contaminating them.

Tape thickness ranges from .005 to .05 in. in continuous lengths 12 in. wide.

Hole sizes run from .020 to .062 in. and number of holes per square inch range from 74 to 952. Percentage of open area varies from 18 to 37 percent.

Sheets 1/16 and 1/8 in. thick are available up to 24x24 in., with hole sizes .033 and larger. Sheets 1/8 in. thick and up are available to 24 in. sq., with hole sizes .045 in. and up.

Teflon is impervious to acids, alkalis, and solvents, with the exceptions only of molten sodium and fluorine.

It is tough, resilient, and extremely anti-hesive. In filtering and sifting, it may be used in single or multiple thicknesses, according to the problem involved.—*United States Gasket Co., Camden, N. J.*

Circle 131A on Reader Service Card

Makes Flat-Sheet Glass To Curb Heat, Glare

Functional characteristics of the Solex-type heat-absorbing, glare reducing glass have now been successfully imparted to flat-drawn sheet glass.

Known as Pennvernon Solex, the new glass is available in cut sizes not to exceed 15 sq. ft. It is manufactured in only one thickness, 7/32 in.

Reduction in the intensity of solar radiation has been the aim. Thus, heat is taken out of sunshine without sacrificing the light transmission characteristics of high quality glass.

Solex absorbs the red portion of the solar spectrum so that the light then transmitted is easier on the eyes. A room glazed with this glass is reported to be 10 to 20 deg. F. cooler.

Where perishables are stored, new glass is seen helping to prevent deterioration by virtue of its heat-absorbing qualities.—*Pittsburgh Plate Glass Co., 632 Duquesne Way, Pittsburgh.*

Circle 131B on Reader Service Card

Flush-On Preparation Aids Concrete Floors

Years of maintenance-free service are claimed added to the life of concrete floors with use of Flintcrust Liquid, a flush-on preparation.

Successfully used on floors that receive rough traffic, this preparation is said to end sanding, dusting, and the usual break of the floor which follows. Under the microscope, a concrete surface consists of numberless tiny hills and valleys. Sanding commences when traffic rolls over these hills, breaking them down.

New liquid prevents this, it is claimed, by case-hardening the surface, sealing and binding the concrete into a tough surface. Material also makes floor resistant to penetration of disintegrators like acid, grease, oil and water.

Liquid is easy to apply, according to maker, as it is flushed on like water, does its job immediately, and traffic need not be interrupted.—*Flexrock Co., 3604 Filbert St., Philadelphia 4.*

Circle 131C on Reader Service Card

New "No-Stick" Finish Incorporates Plastic

Announced is unique kind of paint —"Teflon" polytetrafluroethylene finish—notable in that practically nothing will stick to it.

Material is being tested as a coating on bread baking pans to eliminate greasing before each bake. Elsewhere in bakeries where dusting with flour has been required to prevent dough from sticking, Teflon has solved the problem and increased output in doing so.

Engineers, particularly in packaging industry, have been occupied with the problem of glue sticking to machine parts preventing accurate and efficient operation. A similar headache exists where sticky substances such as candy, and frozen foods are apt to cling to the smoothest metal surfaces. New finishes seem to cure these troubles.

Finish is a water suspension of a plastic which has a high chemical, heat, and moisture resistance. Finish must be fused at about 750 deg. F. in special equipment.—*E. I. DuPont de Nemours & Co., Wilmington, Del.*

Circle 131D on Reader Service Card

OTHER DEPARTMENTS

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In Behalf of Progress . . .

Wage-Boost Threat Calls for Three-Way Action

Food manufacturers face a serious wage threat. We refer to labor's determination to tie pay raises to the general increase in industrial productivity.

Now the only boost in productivity that permits a particular food processor to up wages—without hiking prices—is that in his own factory. Even the trend in his branch of the industry is meaningless. Anyway, there is no uniform trend in most branches of the industry.

Canning and preserving experienced productivity changes ranging from minus 6.7 percent to plus 11.2 percent in the 1939-50 period—with a 12-year gain of 31.6 percent.

In milling, the figure varied from minus 7.6 to plus 5.1, for a total rise of 14.1. Productivity changes in candy plants were between minus 3.8 and plus 5.7, for a total boost of 21.9. The malt beverage range was minus 4.6 to plus 9.5, for a 26.9 gain. And so it goes.

How could any branch of the industry—much less any single plant—negotiate a fair productivity wage increase in the face of such ups and downs?

Yet CIO wants wages geared to a general productivity gain of 4 percent per year. AFL takes the productivity increase as the minimum base for wage boosts. Then it tosses in a "catch-up" adjustment of 11 percent. This is based upon an alleged productivity increase of 5.9 percent in 1950 and another of 5.4 percent last year.

Labor is not entitled to all the benefit from productivity increases—to which it usually contributes little or nothing. Especially is this true in the highly competitive, low-profit food manufacturing field.

In our industry, it is important that part of the gain be available to improve quality and lower prices. It is necessary, too, to pay higher dividends to attract capital for future growth and to meet emergencies. And it is vital that the profit margin be increased to pay for modernization and research.

The need for more profit is beautifully put by Hormel's President Corey. He reveals that his company would have only 2,000 employees today—instead of its 8,000—if the profit level of recent years had prevailed throughout Hormel's history.

This serious problem dictates three self-survival actions on the part of food plant management:

1. Exert every influence to bring the balance of power between labor and management back to an even keel—a job that must be done through your Congressmen in Washington.

2. Measure the productivity change in your own plant so that you will have that figure to use in labor negotiations.

3. Do your utmost to raise your plant's productivity at least as much as the general industrial average. Only then will you be in a safe economic position.

While labor should benefit from rising industrial efficiency, so also should the consumer—for the good of our dynamic economy.

And certainly manufacturers are entitled to a slice of their fruits of progress large enough to finance further progress.

Challenge From Within—"We Must Modernize"

Charles H. Bell—dynamic young president of progressive old General Mills—presents a challenge to millers which applies to other food manufacturers.

Here it is, as made in his address at the annual convention of Millers National Federation:

"The key to American business success has been the willingness of management to recognize change, to accept the principle of early obsolescence, and to embrace all the new and better techniques.

"In the midst of this history-making pattern of change and progress, I would ask if we in this industry have kept ourselves abreast of all the technological improvements which might be applied to the milling art?

"Lack of technical progress is one of the most severe problems of our industry. We can no longer afford to continue our philosophy of complacence which leads to outmoded obsolescence.

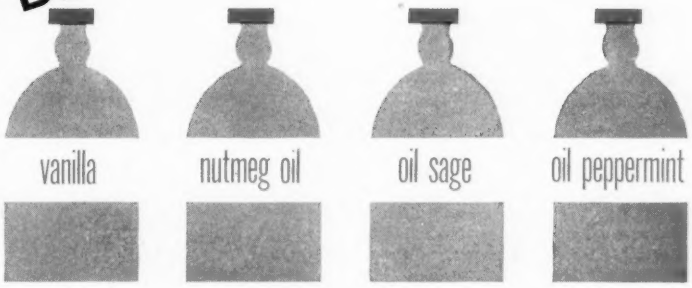
"We must modernize."

This is not idle talk. Over $3 million of General Mill's profits for the past fiscal year were reinvested in the business. And the company has negotiated a $15 million long-term loan to finance product development and expansion of facilities.

Now consider this in relation to another classic observation made by Mr. Bell, at another time and place. He said that food companies are not competing "product against product, but management against management." And since it is a prime function of management to keep its company abreast of progress, food manufacturers are competing modernization against modernization in a very big way.

In fact, the well-defined trend to larger, more efficient plant operations indicates that you modernize or you move over to make room for someone who does.

A BETTER SOLVENT



for finer food flavors

propylene glycol, U.S.P.

Dow Propylene Glycol, U.S.P. is widely used as a safe, effective solvent in the preparation of flavor solutions from essential oils and resins, and in the extraction of many other natural flavoring materials.

Stable emulsions are more easily formed with Propylene Glycol as a gum wetting agent.

Because of its performance, economy and high purity, Propylene Glycol, U.S.P. has found wide acceptance in the food field. Get the facts on how it can help you by writing to Dow, Dept. OC 15.

THE DOW CHEMICAL COMPANY
MIDLAND, MICHIGAN

DOW
CHEMICALS
INDISPENSABLE TO INDUSTRY AND AGRICULTURE

TURN PAGE FOR FOLDOUT FLOWSHEET →

Making Pectin From Lemons

How Peel Is Processed to Yield Rapid- and Slow-Set Products

FOR MANUFACTURING pectin, Exchange Lemon Products Co., Corona-Covina, Calif., flumes peel directly from pulp stills in its oil production line. In short, this operation further ramifies ELP's versatile use of every part of the fruit.*

Arriving at the pectin house, peel is reeled free of flume water, dropped into measuring tanks—Point (1) in diagram—and fresh water is added. A 3-ton batch then goes to an extraction tank (2), where SO_2 solution is added and cooking proceeds at 95 deg. C. using low-pressure steam injection. After a holding period, the batch flows to the reelhouse, where pectin liquor is separated. Mixed with filter aid, the liquor is passed through a filter press and collected in tanks.

Clear liquor is pumped to a cooling and degassing tower, where its temperature is reduced to 30 deg. C. $AlCl_3$ and Na_2CO_3 are added to the liquor in precipitation tanks and resulting green pectin is reeled free of effluent. Additional effluent is removed by hydraulic press (3).

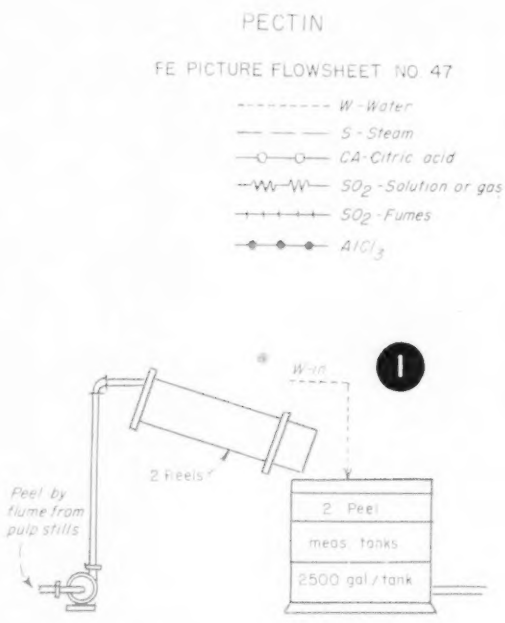
Pectin, in cakes, is fed first to a low-speed breaker, then a shredder, and drops into a grinder tank. Here, it is mixed with alcohol, which hardens it and also acts as a first rinse. This slurry is pumped to a slow-speed (Bird) centrifuge for alcohol recovery. Pectin drops from the centrifuge into the first acid-wash tank, to which a predetermined amount of acid-alcohol solution is pumped. From here, the slurry is pumped to the pectin washers, where the solution is drawn off by vacuum through a filter in the bottom of the unit.

CONSTANT REFINEMENTS IN TECHNIQUE have kept this line in the forefront of efficiency. Read the full story of these developments in this month's special article, "Engineering Quality Pectins"—on page 87.

A variation to the rapid-set pectin process occurs at this point when slow-pectin is made. Green material destined as slow-set finished pectin is dumped into a buggy and thence into a retardation tank. Second rinse acid-alcohol is added and the slurry warmed for an extended time while being agitated. It is then pumped back to a washer to complete this process. In these units, pectin is washed eight times to remove discoloration and impurities. Ammonia is added to a fresh alcohol rinse to obtain a pH of 4.0.

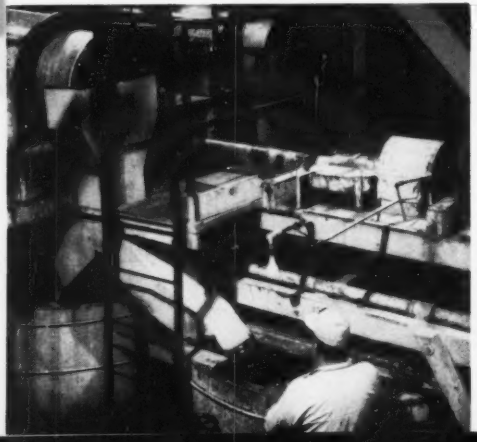
The final solution is filtered from the pectin, which is then dumped into a buggy and moved to the two-stage vacuum dryer for heating at 77 deg. C. The first drying stage reduces the material's moisture content to about 30 percent; the second stage to 7-10 percent.

From the dryer it is conveyed to storage bins. Unstandardized pectin is then air-conveyed to the screening and grinding department and finally on to packaging (4).

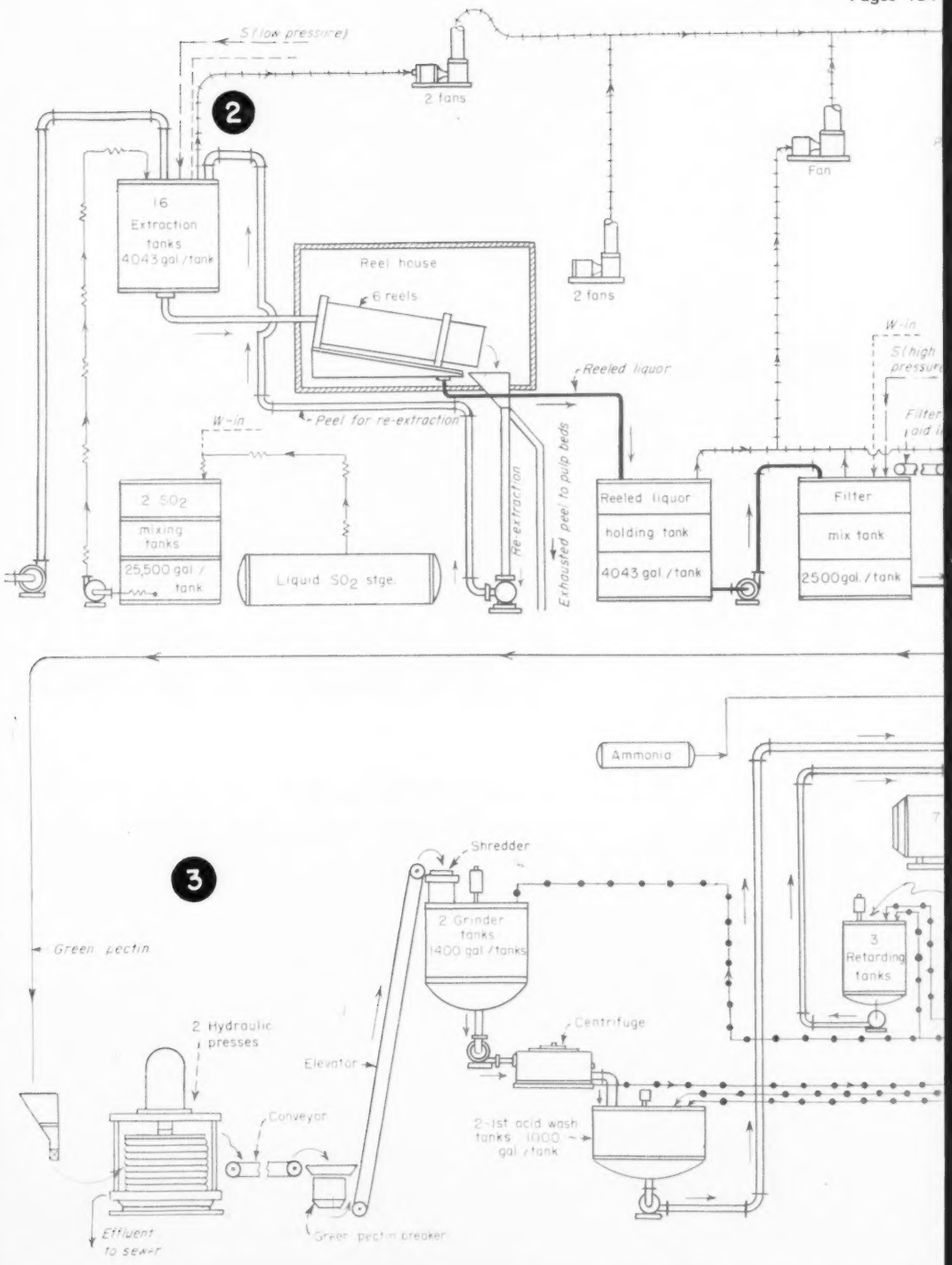


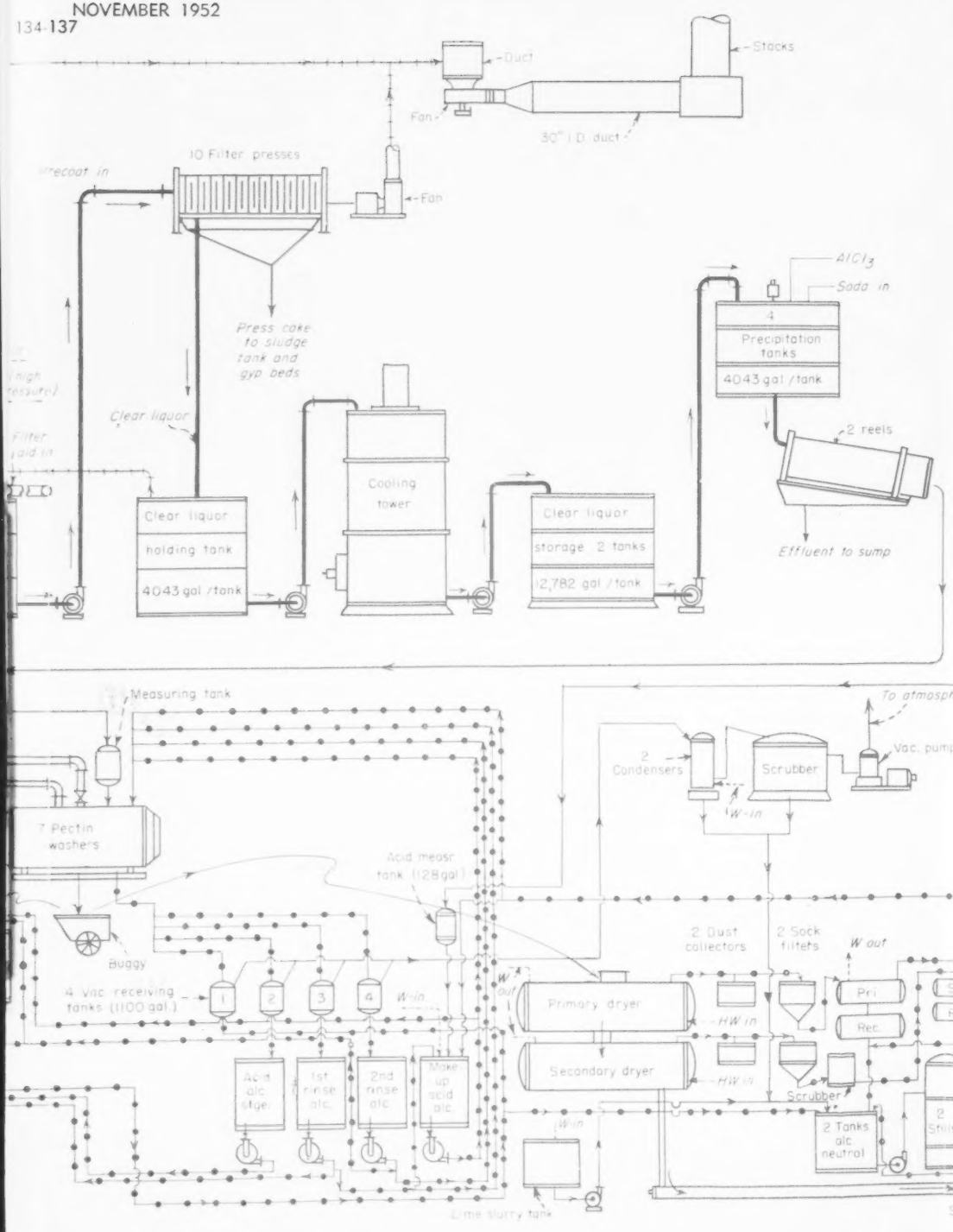
* For related details of this company's multi-product processing, see September FE (article on juice and oil manufacture, p. 114; oil-making foldout flowsheet, p. 136-139).

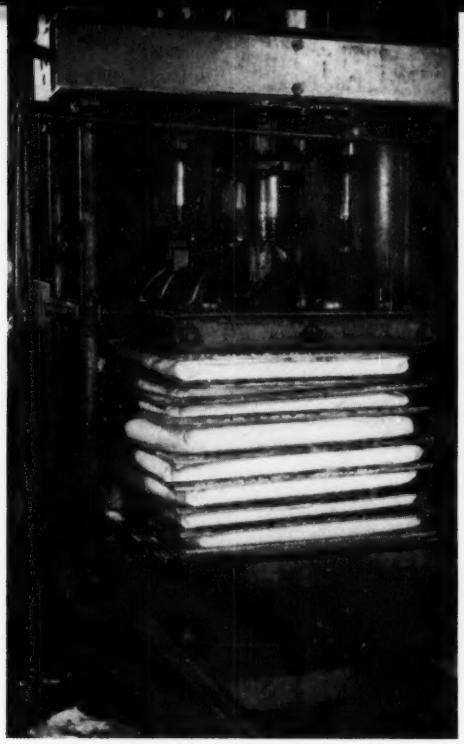
1 FLUMED in from oil process, peel enters pectin plant via reels (top left), drops to measuring tanks.



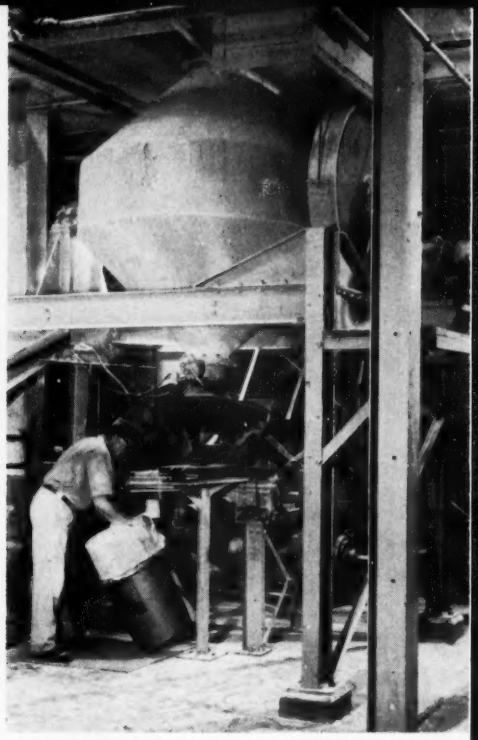
2 IN EXTRACTION TANKS, macerated peel is cooked in dilute sulfurous oxide. Operator checks solution's pH value.


2
S (low pressure)
2 fans
16
Extraction
tanks
4043 gal./tank
Reel house
6 reels
2 fans
Fan
W-in
Reeled liquor
Peel for re-extraction
W-in
2 SO2
mixing
tanks
25,500 gal./
tank
Liquid SO2 stge.
Re-extraction
Exhausted peel to pulp beds
Reeled liquor
holding tank
4043 gal./tank
Filter
mix tank
2500 gal./tank
Ammonia
3
Shredder
2 Grinder
tanks
1400 gal./tanks
3
Retarding
tanks
Green pectin
2 Hydraulic
presses
Elevator
Centrifuge
Conveyor
2-1st acid wash
tanks 1000
gal./tank
Effluent
to sewer
Green pectin breaker

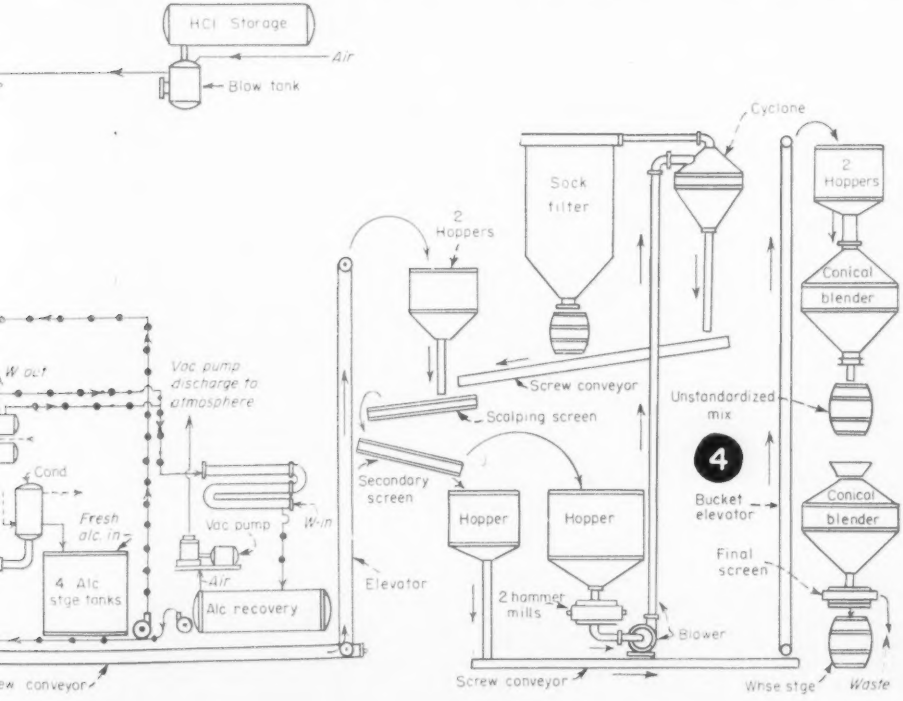

Duct
Stacks
Fan
30" I.D. duct
10 Filter presses
precoat in
Fan
Press cake to sludge tank and gyp beds
Clear liquor
Filter aid in
Clear liquor holding tank
4043 gal./tank
Cooling tower
Clear liquor storage 2 tanks
12,782 gal./tank
AlCl3
Soda in
4 Precipitation tanks
4043 gal./tank
2 reels
Effluent to sump
Measuring tank
7 Pectin washers
Buggy
4 vac. receiving tanks (1100 gal.)
Acid meas. tank (128 gal.)
Acid alc. stge.
1st rinse alc.
2nd rinse alc.
Make up acid alc.
W in
W out
Primary dryer
Secondary dryer
HW in
Lime slurry tank
2 Condensers
Scrubber
To atmosphere
Vac. pump
2 Dust collectors
2 Sock filters
W out
W out
Pri.
Rec.
Sec.
Rec.
Cond.
Scrubber
2 Tanks alc. neutrol
2 Stills
Screw conveyor



3 HYDRAULIC PRESS, run at 600 psi., removes mother liquor from precipitate. Cake is then shredded.



4 IN PACKAGING department, vibratory feeder moves pectin from hopper (above) into 200 lb. drums.

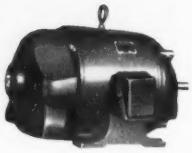


GUARD YOUR PRODUCTION AGAINST

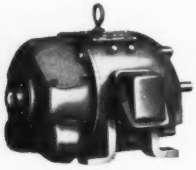
the Hazard of SPLASHING LIQUIDS

WITH

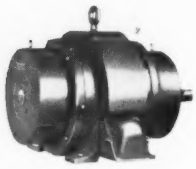
Century SPLASH PROOF MOTORS



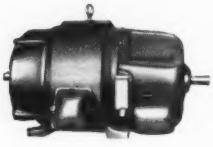
Century 7½ HP Type RS Single Phase Repulsion Start Induction Brush Lifting Splash Proof Motor.



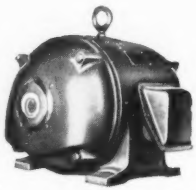
1 to 7½ HP Direct Current Splash Proof Motor.



150 to 400 HP Type SC Squirrel Cage Induction 3 Phase Splash Proof Motors

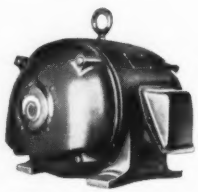


30 to 100 HP Type SR Slip Ring Induction 3 Phase Splash Proof Motors.



1 to 125 HP Type SC Squirrel Cage Induction 3 Phase Splash Proof Motors.

3 to 25 HP Type SR Slip Ring Induction 3 Phase Splash Proof Motors.



1 to 20 HP Type CS Capacitor Start Induction Single Phase Splash Proof Motor.

Keep the vital parts of your motors dry —even when the full force of a hose is turned directly on them. Century Splash Proof motors eliminate production losses due to dripping or splashing liquids or falling solids. They also protect against rain, snow, sleet or hail on outdoor installations.

Century Splash Proof motors are available in a wide range of types and sizes for all popular applications. Other types and ratings are available to meet your electric power requirements. You can specify Century motors with confidence.

Century motors are built in sizes ⅓ to 400 horsepower.

697

CENTURY ELECTRIC COMPANY, 1806 Pine Street, St. Louis 3, Missouri
Offices and Stock Points in Principal Cities

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These C
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TIGHT SEATING—
lead-face
disc and

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General
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VALVES • FIT

OR SAFE CONTROL OF REFRIGERANTS IN IGH PRESSURE SYSTEMS

CRANE HEAVY-DUTY L-IRON "AMMONIA" VALVES

These Crane Ferrosteel Globe and Angle Valves are specially designed for high pressure ammonia refrigeration service. Special seating design, with extra-tight stem seal and bonnet joint, and rugged all-iron construction provide for safe and economical handling of hazardous liquid or gas refrigerants. In big and small systems, these valves have an outstanding record for durable dependability with lowest maintenance cost.

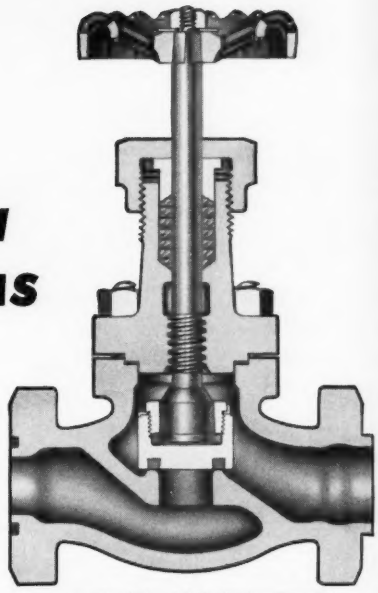
SEATING—two disc-seat combinations available: (1) special lead-faced disc and integral body seat rings; (2) steel disc and renewable steel seat rings.

-TIGHT STEM SEAL—Unusually deep stuffing box is filled with high grade packing. Machined "back seating" shoulder on stem relieves internal pressure on packing, further assuring a pressure-tight stem seal when valve is wide open.

ED CONSTRUCTION—Heavy, massive metal sections in body help resist distortion; long, sweeping interior body contours reduce flow resistance.

ROOF END CONNECTIONS—Flanged valves have tongue and groove faces for greater tightness and to protect against gasket blowouts. Screwed valves have long threads with a recess for soldering joints.

ANION LINES of check valves, expansion valves, flanged or screwed fittings, flanges, unions, return bends, fittings for coils and condensers are available. Ask your Crane Representative about this better refrigeration equipment, or see your Crane Catalog.

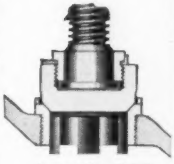


(Cross-Section) No. 1501, Globe, Flanged
Working Pressures: 300 pounds ammonia; 500 pounds oil, gas, or air up to 100° F.
Sizes: ½ to 4-inch.
Tested at 300 pounds Air-under-Water

CHOICE OF TWO TIGHT-SEATING DESIGNS

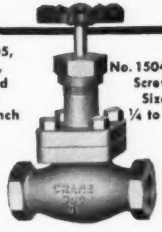
Cross-section of lead-faced disc

Crane special lead-faced disc—with facing securely rolled into machined dovetail—seats against crowned face of integral body seat ring to assure tightness in service. Where temperature or corrosive action does not allow use of lead, these valves can be supplied with a case-hardened steel disc and screwed-in steel seat ring.



Cross-section of steel disc and seat

No. 1505, Angle, Screwed Sizes: ¼ to 3-inch



No. 1504, Globe Screwed Sizes: ¼ to 3-inch

CRANE CO.

General Offices: 836 S. Michigan Ave., Chicago 5, Ill.
Branches and Wholesalers Serving All Industrial Areas

VES • FITTINGS • PIPE • PLUMBING AND HEATING

makes mincemeat out of old production schedule

Thirty minutes per batch was the time schedule on mincemeat cookers at this eastern food plant . . . but that was **before** they replaced old-type traps with Yarway Impulse Steam Traps.

Now it's 15 minutes—one-half the time—and the plant superintendent is so enthusiastic over the production increase that he is personally spreading the news about Yarways to other plants.

A good record? Yes—but not unusual for Yarway. Yarway traps are **designed** to increase production—by sending the most practical B.T.U.'s at top temperatures into your process or product. **They get equipment hotter, sooner . . . and keep it hot.**

Small size, easy installation, good for all pressures, dependable operation, low maintenance and low cost are other reasons why over 750,000 Yarway Impulse Steam Traps have already been installed in plants everywhere.

It's easy to buy Yarways . . . 216 industrial distributors stock and sell them. One is located near you.

YARNALL-WARING COMPANY
127 Mermaid Avenue, Philadelphia 18, Pa.

NEW TRAP SELECTOR—New 20-page book tells you the right steam trap for any specific application. Write for your free copy.

YARWAY

the steam trap designed with production in mind

How PROSPEROUS Is The USA?

Just how prosperous *are* the people of the United States?

The sole purpose of this message is to help clear up the confusion and controversy that surrounds this important question.

To find out how much prosperity, or material well-being, the people of the United States now enjoy, it is necessary to get answers to these questions:

1. As compared with other times, what is the total amount of goods and services that we have available for our enjoyment?

2. How great, on the average, is the share of each American in this prosperity?

3. How does our prosperity compare with that of other nations?

National Product at Peak

The government statisticians who do the bookkeeping for the nation produce a figure called the Gross National Product. It is supposed to be the total obtained when you multiply the amounts of everything we produce by the prices of everything produced. This year the GNP, as it is commonly tagged, will add up to something like $345 billion.

Since this will be the highest total that GNP has ever attained, some people will acclaim it as evidence that we now are enjoying the greatest prosperity on record.

The GNP, however, is not an accurate yardstick of prosperity. It may go up because of price inflation alone without any increase at all in the output of goods and services. Also the GNP includes very large amounts of goods and services, such as those for the military, which are in fact a result of misfortune rather than of a condition that might properly be called prosperity. Moreover, there is no deduction from the GNP to make allowance for the equipment that is worn out in producing it.

Little Recent Progress

When we make adjustments such as these — to find out how much of our production really is available for the use and enjoyment of the civilian population — the *adjusted* national product since the beginning of World War II comes out about as follows. The effects of price inflation have been removed from these figures.

YEAR	ADJUSTED NATIONAL PRODUCT	
	Billions 1951 Dollars	Index (1946 = 100)
1940	$176.2	76
1946	232.5	100
1947	240.7	104
1948	244.3	105
1949	239.7	103
1950	260.9	112
1951	267.9	115
1952	264.3	114

From this table the fact stands out that progress in raising our level of prosperity has been halting. What progress we have made came in a few dramatic increases before or after a military build-up. Aside from those, the progress has been fairly slow. This year, 1952, it has been particularly discouraging.

Again, when account is taken of the number of people who must share in the goods and services that are available, our progress is even less marked. This is shown by the following table which gives the share of the average American in the national product. This, as the table indicates, is arrived at simply by dividing the total of available goods and services by the population on hand to share in them.

YEAR	POPULATION Millions	ADJUSTED NATIONAL PRODUCT Billions 1951 Dollars	ADJUSTED NATIONAL PRODUCT Per Person
1940	132.0	$176.2	$1,335
1946	141.3	232.5	1,645
1947	144.0	240.7	1,672
1948	146.6	244.3	1,666
1949	149.2	239.7	1,607
1950	150.6	260.9	1,732
1951	154.4	267.9	1,735
1952	156.9	264.3	1,685

Here it is clear that we have made little or no headway since the end of World War II.

U.S. Compared to Other Nations

Although we are making slow progress in increasing our prosperity, as measured during recent years by the amount of goods per person, we still are by long odds the most prosperous people on earth. This can be seen from the following table. It offers a rough measure of how the adjusted output of goods and services per person in the United States compared in 1951 with that in a number of other countries:

COUNTRY	PER PERSON
United States	$1,735
Canada	1,231
United Kingdom	614
France	510

To figure more closely "How Prosperous is the U.S.A.?" we must answer a number of other questions. One of the most important will be the subject of a later editorial in this series. It is "Who Gets What?" How have various income classes and occupational groups shared the total available goods?

Another question that has a basic bearing on the quality and durability of our prosperity is "How fast are we using up irreplaceable natural resources, such as oil, iron ore, and copper, to sustain it?" Any attempt to deal with this very complicated question must also be deferred.

A Problem for the Future

In the meantime, however, key facts about our prosperity are that:

1. Most of the increase in the nation's total production in recent years has been to meet military requirements rather than to improve the American standard of living.

2. The increase in the supply of goods and services actually available for the average American has been slow and halting.

3. We Americans are still extremely well provided with the good material things of life, as compared with peoples in other lands.

These three facts bring to mind a whole series of policy questions. What can be done to speed up progress in improving our prosperity? What—to repeat the question discussed in the previous editorial in this series—can be done to make our prosperity less precarious?

Here, however, the purpose is not to prescribe. It is simply to indicate as accurately as it can be done in a brief article the actual state of the nation's prosperity.

In doing this much, it can properly be remarked that the record presents to the American economy both a problem and an opportunity of surpassing importance. It is that of building a prosperity that will be both more progressive and more secure than any we have known in recent years. In the light of what clearly remains to be done, we shall make a grave mistake if we use up any of our energy in congratulating ourselves on the relatively meager progress here recorded.

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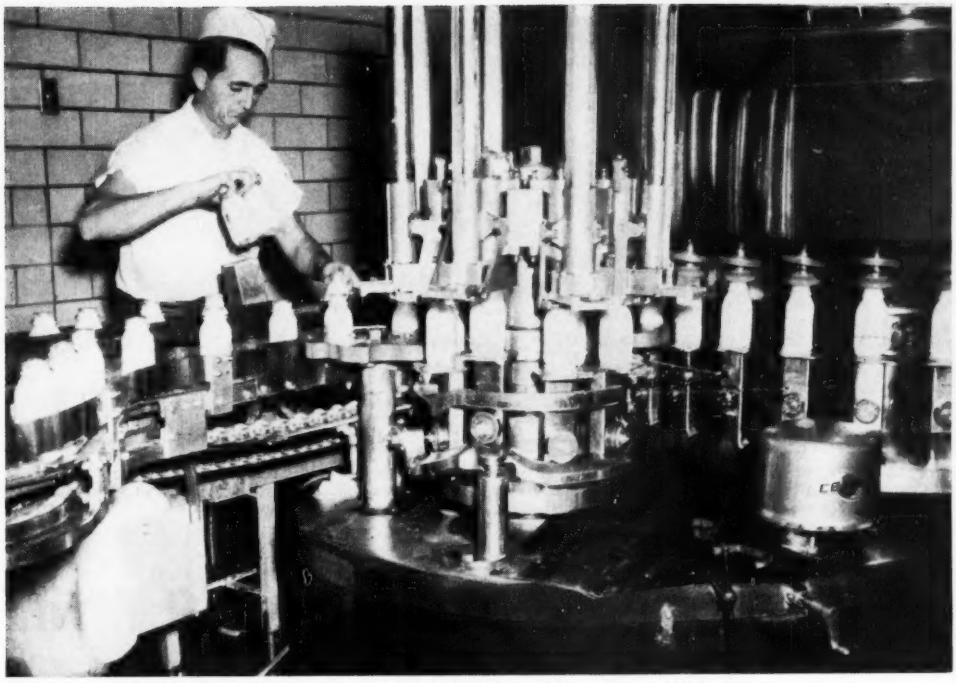


THEY FILL AND CAP Junior Jugs right on regular bottling line, without added attachments.

Milk in *Bottles Ready for Baby*

All set for capping with nipples, special half-pints save mothers' time. Dairy goodwill built, sales broadened. No extra plant units needed

FE STAFF

Here's an unusual idea that has developed into a real business getter for a New Jersey dairy.

It's the "Junior Jug," an 8-oz. bottle of homogenized vitamin D milk for baby feeding that requires no home sterilization.

In the dairy, the bottles are washed and sterilized in the soaker-washer, filled and capped on the regular unit. Thus, no additional equipment is required for the operation.

But how did this development come about?

Several years ago, Bo Adlerbert, President of Sunrise Dairies, Hillside, N. J., decided that if he could transfer the chore of washing, sterilizing, and filling baby bottles from the kitchen to his dairy, he would be doing the busy housewife an excellent service. Also, it should be an excellent method of acquainting the new mothers with his products.

"Why," he reasoned, "should this operation be performed manually in a large number of homes when it can be done automatically—and at very little cost—in our dairy?"

Result of this enterprising idea was the Junior Jug, a square ½-pt. bottle with a special threaded top that fits any standard screw-type nipple cap. After filling in the plant it is capped with an aluminum closure, cased in a standard ½-pt. case, and stored in the refrigerated room.

Filled bottles are delivered to the home by regular delivery service and stored in the refrigerator until used.

When it's time for baby's bottle, the aluminum cap is removed and a sterile nipple screwed on the Junior Jug. The milk is then warmed as in a regular nursing bottle. After use, the bottle is rinsed and returned to the milkman on his next delivery trip.

It should be mentioned here that this milk is not intended to replace a special formula. Rather, it fills the gap from the time baby goes off the formula until he is big enough to drink milk from a glass.

No Added Inventory

The bottles are also used as regular ½-pt. containers for the other products filled by the dairy. This eliminates the need for an additional inventory item.

Although the Junior Jug in itself has not proved particularly profitable, it has accomplished the main objective of acquainting housewives with Sunrise's products and service. As such it has given a very good account of itself.

1 STALKS OF BROCCOLI arrive from receiving platform on flat belts and are placed on spiked conveyor (center) with blossom ends against inside row of spikes. Stalks then move past rotary knives and are trimmed to uniform lengths. Finally, heads pass up inclined belt under sprays of chlorinated water.

Farm-Truck to Freezer *In 19 Min.*

—with water content uniform, handling and refrigerating time minimized, and labor saved. That's Biscayne's striking performance on broccoli—beans too—using specially engineered equipment . . . System suited to other green vegetables

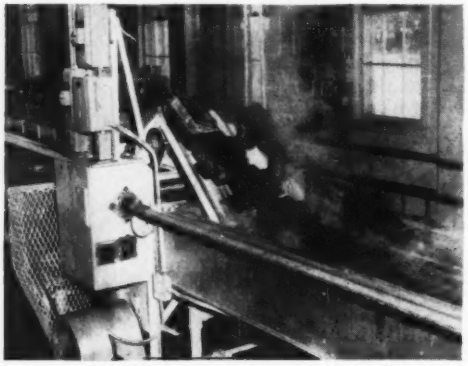
ARTHUR L. STAHL and C. J. JOHN

Respectively, Director of Food Research Laboratories, and Development Engineer, University of Miami, Coral Gables, Fla.

Through employment of a special high-speed mechanical setup, quickness is combined with quality in the continuous processing and packaging of broccoli and green beans conducted for Biscayne Frozen Foods, Miami, Fla.

It's a mere 19-min. run for the vegetables from receiving platform to filled containers. What's more, water content is controlled for uniform weights. Also handling is much reduced, meaning less labor. And freezing time is shortened.

This system can process 1 ton of broccoli or 2 tons

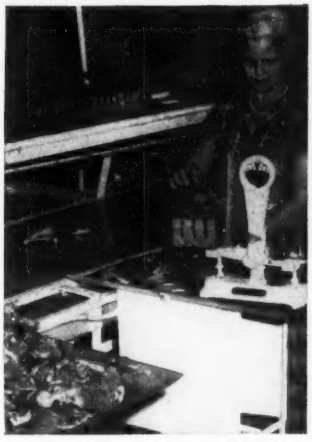


5 FILLED BOXES are carried through 30-ft. trough of 200-deg.-F. water to blanch broccoli. Later, they go through 65-70 deg. water and, finally, over 40 ft. of Freon-refrigerated coils that cool product to 38-40 deg.

6 CENTRIFUGING for 6 sec. at 200 rpm. in 6-ft. dia., 18-box capacity units (there are two) removes excess moisture. Boxes are then conveyed to packaging and are manually dumped into 3x5x9¼-in. containers.

2 MEDIUM sized heads are halved, large ones quartered by slitting knives. Small heads are uncut.

3 A AND B grades are fed into separate chutes that discharge to divided belt. Pieces go for soup stock.



4 HEADS are weighed into aluminum boxes, lids are fastened, boxes are placed on conveyor (background).

of beans per hour, and it is applicable to other green vegetables.

Some of the mechanical components are standard, while others are inventions of Co-author John. Patent applications have been filed on the latter units.

The new processing equipment is housed in a 1-story frame building on the 2,080-acre research campus of the University. Incidentally, 360 acres of this campus are set aside for an experimental farm.

Some of the parts for the new equipment were built in our own machine shop, and others were made on a job-contract basis by foundries and sheet metal shops in Miami. The assembly was carried out under our supervision.

Four of the developments that make this system unique deserve particular mention:

1. Cast aluminum boxes into which desired quantities of vegetables are weighed prior to blanching. These boxes measure 3x5x9½ in.—the same as the inside dimensions of the final-pack container. This uniformity facilitates transfer of vegetables from metal boxes to containers.

2. A conveyor system that moves the vegetable-filled aluminum boxes along the 30-ft. blanching trough, through cooling sections—employing water and Freon—and to the emptying station, then returns the empty boxes to the weighing stations.

3. Special centrifuges that hold 18 of the filled metal boxes and spin them 6 sec. to remove excess water, thus assuring uniform moisture content in each final package-lot of vegetables.

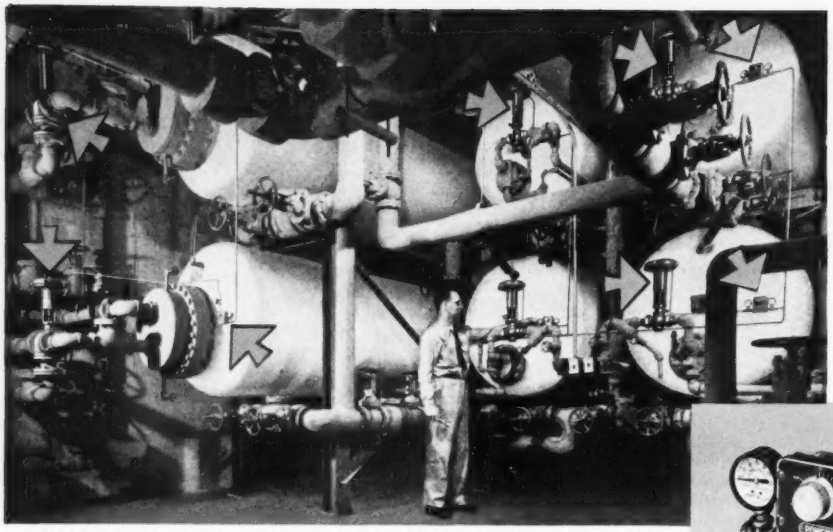
4. A special feeding mechanism that slowly moves trays of finished packages through the freezing tunnel—approximately 38 ft. in 2 hr.

The main processing line is 130 ft. long, having loading, blanching, pre-cooling, chilling, and draining stations. The latter is supplemented by two centrifuges in operational relationship with it.

Operating over the entire length of the line are two conveyor chains equipped, at 1-ft. intervals, with carriers that hold the removable cast-aluminum boxes.

(*Turn to page 150*)

7&8 FILLED containers are checkweighed (left photo) then wrapped and stamped (right). Subsequently they are placed in 30x31-in. trays and mechanically moved through 38-ft. Freon-refrigerated freezing tunnel (background left photo). Approximate freezing time is 2 hr. Upon leaving tunnel, packages are cased and stored at —5 deg. F. until shipped. This quick packing and freezing insures retention of fresh qualities.



Chief Engineer Edward MacDonald states "Performance of Powers Accritem Temperature Regulators has been highly satisfactory on the 6 water heaters shown above as well as on booster heater for dishwasher and for controlling cooling of condensate before discharge to sewer."

WATER HEATERS AT LEVER HOUSE New York City

Architects: Skidmore, Owings & Merrill

Consulting Engineers: Jaros, Baum & Bolles

Contractor: Gillman-Rous-Pesce Corp.

One of Lever Brothers Co. Famous Soaps

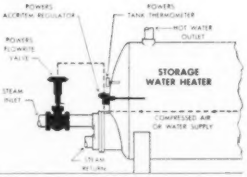
Powers ACCRITEM Regulator
Compressed Air or Water Operated

Unsurpassed for reliability and power to operate large or small diaphragm valves controlling Water Heaters, Heat Exchangers, Jacket Water Cooling for Diesel Engines or Air Compressors and many Industrial Processes.

®POWERS WATER TEMPERATURE CONTROL

ACCRITEM Regulators were selected for LEVER BROTHERS beautiful modern building on Park Avenue in New York City. The air conditioning system here is also Powers controlled.

Water heaters in more and more prominent buildings are being equipped with Powers Accritem Regulators because of their —



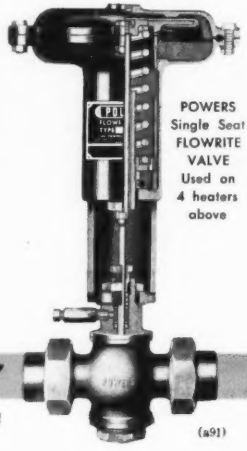
POWERS 3-Way FLOWRITE Water Mixing VALVE Used on two heaters above

Important Features that Give Better Control and Lower Maintenance

- ***Adjustable Sensitivity*** and over-heat protection.
- ***Calibrated Dial*** temperature adjustment.
- ***Simple, Rugged Construction*** withstands vibration and insures years of reliable service.
- ***Temperature Ranges*** 50-250° F. and 150-350° F.
- ***Easy to Install.*** Requires 15 lb. supply of compressed air or water for its operation.
- ***Small Size***—regulator head is only 2⅞" x 3⅝", sensitive bulb is 12" long with ½" I. P. S. connection.

Bulletin 316 gives full details

Call Powers for aid with your problems of temperature control. Our more than 60 years of experience may be helpful to you. Whether you want a simple self-operated regulator or thermostatic water mixing valve or a pneumatic control system with recording controllers. . . contact Powers.

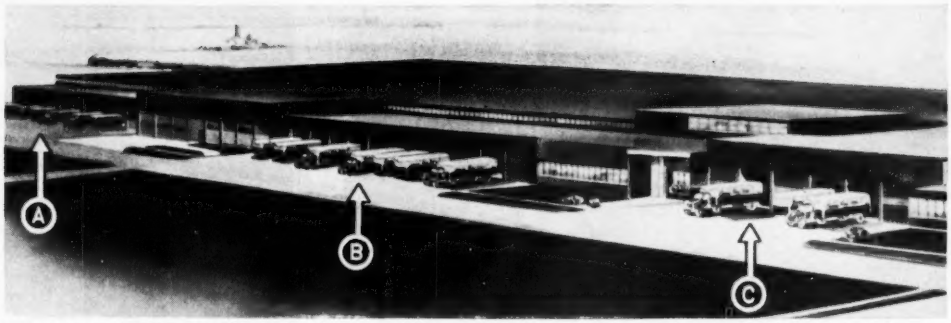


POWERS Single Seat FLOWRITE VALVE Used on 4 heaters above

THE POWERS REGULATOR COMPANY

Skokie, Ill. • Offices in Over 50 Cities, See your phone book • Established 1891

(a91)



EXCELLENT INTEGRATION of distribution facilities is portrayed in this sweeping sketch of colossal warehouse's shipping flank. (A)—20 unloading docks; (B)—24 loading docks; (C)—Large truck-fleet maintenance garage.

They Didn't Spare the Distribution

Thus Highway Shipments Are Always "On the Dot" At Wolf's Huge New Detroit Warehouse

Million-case facility has more than two score docks, a "five-at-a-time" garage, and latest time-and-money saving equipment for maintenance of fast and most efficient service with its fleet of 119 tractors and trailers

STRIKINGLY efficient loading and unloading facilities, backed up by ample garage space and the latest fleet-maintenance equipment, are features of the huge new Abner A. Wolf, Inc., food warehouse at Detroit.

This plant, just opened in June, ranges a full 1,000 ft. in length by 411 ft. in width, providing no less than 350,000 sq. ft. of floor space. It is accordingly hailed as the biggest dry-foods storage unit under one roof.

A million cases of food can be stored here at one time. And the foresight in providing such potential is abreast with the fact that this company's sales volume hit $65 million in 1951 and is anticipated to top $100 million this year.

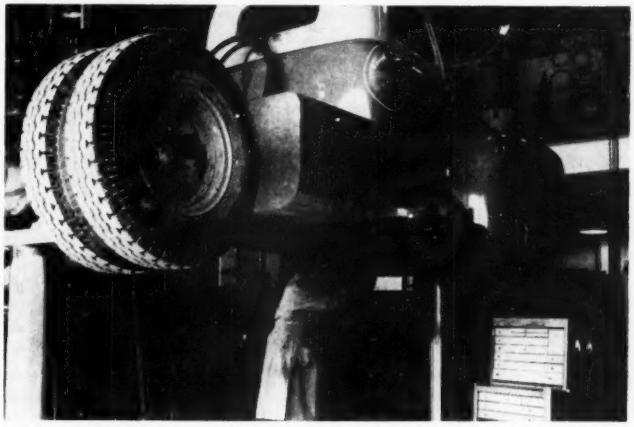
Meeting the Pace

To design, build, and equip a new food warehouse for most efficient storage and interior handling of goods is not extraordinary. It is the modern way. But too often, in notable instances in the past, projects have "missed the top" because the structural conception failed to take full account of the needs—current and future—of the distribution fleet.

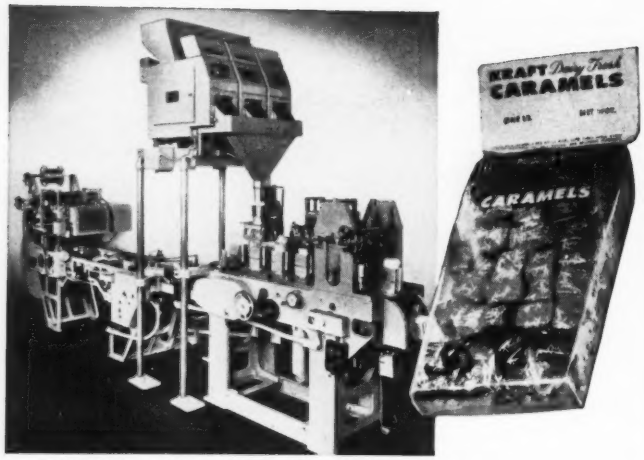
Thus, otherwise-suitable facilities have quickly fallen into obsolescence.

But Wolf executives saw to it that this won't happen here.

To handle the company's sizable and growing operations, there have been provided 24 outgoing truck loading docks in an enclosed space affording full protection from the weather. And as a further safeguarding measure, this area has outside overhead doors. These are electrically controlled either from remote points on the loading platform or from the bay



TRUCK SERVICING is sped by this powerful 2-cylinder vehicle lift, replacing inconvenient floor pits. Note handy balcony (top right) for storage of parts and materials.



SHELL-PAKIT bag-making, weighing and filling machine

EXTRA STRONG Cellophane Bags

Now you can package your product in a machine-made cellophane bag that is so tough you can actually drop it on the floor without bursting it!

The Shell-Pakit bag-making, weighing and filling machine produces this DOUBLE-LAMINATED bag from printed cellophane in roll form. It requires only one operator and has a speed of 35 to 45 filled and sealed bags per minute.

The machine is suited to the packaging of one, two and three pound units. Changes in size can be made in five minutes by adjusting the cellophane cut-off, making a taller or shorter bag. Other dimensions of the bag may also be changed by the use of mandrels. Any free-flowing product, even vegetable shortening, can be bagged successfully on the Shell-Pakit machine. If you are packaging your product in bags or are contemplating doing so, do not fail to get the facts on this superior machine.

Write for information on the SHELL-PAKIT

PACKAGE MACHINERY COMPANY
WRAPPING DIVISION
SPRINGFIELD, MASSACHUSETTS

NEW YORK CHICAGO BOSTON CLEVELAND ATLANTA DALLAS DENVER
LOS ANGELES SAN FRANCISCO SEATTLE VANCOUVER, WASH. TORONTO MEXICO, D.F.

NOVEL STEP that hooks over truck tire simplifies mechanic's job by giving easy reach into engine. Seen is test-cabinet with instruments.

floor. This makes for fast entrance and exit of distribution trucks and tractor-trailers.

For incoming deliveries, 20 trucks or trailers can be backed up simultaneously into ten outside bays, two vehicles to the bay.

The company fleet consists of 64 power units and 55 semi-trailers. The former are made up of 43 tractors, 18 trucks with stake bodies (2 ton), 1 pick-up (1 ton), 1 dump truck (2 ton), and 1 service truck.

Of the 55 trailers, 50 are single-axle carriers and 5 are tandem-axle units with closed van bodies. The former are 30 ft. long and the latter 32 ft. All are used for merchandise deliveries.

Advanced Garage

The warehouse garage in which these carriers are serviced–and in which major repairs can be made when required–is 100 ft. long by 60 ft. wide. It is manned by five mechanics, one of whom is supervisor. This provides a working ratio of approximately one mechanic to each twelve power units, exclusive of semi-trailers.

Actually, the garage floor area is large enough to service or overhaul five tractors at one time.

The garage crew is also able to service and repair the electric forklift trucks and towing tractors employed in handling order lots in the selection aisles of the warehouse proper.

An overhead balcony in the garage provides a convenient place to store a complete line of small parts, most of the "trouble" items. Also notable is

the 3,000-gal. underground gasoline storage tank located outside and adjacent to the garage, completing its fixed equipment.

Inside, a most modern piece of equipment is the two-cylinder lift (see photo) for trucks and tractors. It will raise a complete vehicle off the floor to man-height.

The lift takes the place of the old fashioned pits set in the garage floor. The latter were always dangerous because they tended to accumulate the heavier-than-air gasoline fumes, unless adequately vented by some sort of exhaust fan. Furthermore, they were floor hazards, whereas the newer unit does not restrict the movement of personnel or of vehicles inside the garage.

When a vehicle is lifted clear of the floor on the hoist cylinders—one under the front axle, one under the rear—the entire underside of the unit becomes readily accessible to the mechanic. He has better visibility and can work in a normal standing position.

Thus, greasing, general servicing, and repairs are made simpler—meaning the vehicles are back to work sooner with a resultant saving in costs.

Advanced Units

Another piece of modern equipment is the engine testing cabinet with its modern instruments. It is applied to indicate the condition of an engine's electrical system, generator output, engine timing, spark plug gap, compression in each cylinder, carburetor adjustment, and the carbon monoxide content of engine exhaust.

To speed the engine operations, a novel step unit (see photo) is hooked over a front tire. This enables the tester to perform the necessary work on the engine without lying on, or climbing over, a tractor's front fender.

Finally, three chain hoists, two post hoists, a heavy duty garage crane hoist, several portable mechanic's tool-and-parts cabinets, a 30 cfm. air compressor, a portable compressed air grease gun, a welding outfit, a grinder, and numerous other small tools complete the garage equipment.

—*End*—

Pumping Licks Problems

—*Continued from page 79*

lowering it into a bowl of hot water, which is forced through the line and the continuous mixer.

Handling Jelly

The bakery is also using this pump for feeding jelly onto jelly rolls traveling on a conveyor belt. Jersey Farm makes its own jelly, which is filled into metal drums and then allowed to set. The drum is then transported to the depositing line, where the lid is removed and the pump is placed over the open drum and attached to an air line. From the pump, a 4-ft. rubber hose (1 in. inside dia.) is connected to a T-pipe with ten ½-in. holes to cover the width of the jelly rolls.

Unique thing about the pump is that it breaks up the firmly set jelly to a free-flowing consistency for easy application on the jelly roll. Another thing: If the firm wishes to run narrow jelly rolls, any number of holes on the T-shaped spreader pipe can be sealed off. The pump operates under 20 to 30 psi.

Grandma Cake & Cookie Co., Los Angeles, has a slightly different arrangement for handling jelly to make coconut-topped cakes. Here the pump, similarly placed over an open drum of jelly, is connected by a short hose to a paint-type sprayer. As the cup cakes

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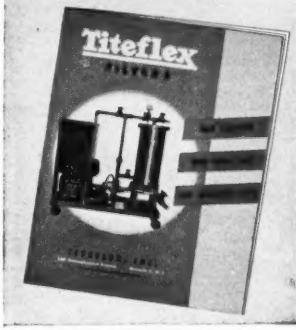

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move along a conveyor, a very thin film of jelly—just enough for holding on the coconut—is sprayed onto them. At the end of the line, the cakes drop into a tray of shredded coconut, ready for packaging.

Dual Jam and Dough Feed

Feeding of fig jam and shell dough to a fig-newton extruding machine is now automatic using a pair of these air-operated piston pumps at Sawyer Biscuit Co., Chicago. One pump, operating at 700 psi., delivers 2,500 lb. of jam to the extruder. The other feeds same amount of dough under high pressure.

Formerly, one man had to hand-feed sections of jam and dough from 10-ft. troughs into head-high hoppers on the extruding machine. Because of the back-breaking nature of this task, it was necessary to relieve this worker every 40 min.

Cake Decorating

Petersen Bakeries, Omaha, Neb., has also put this pump to a novel use—the decorating of cakes with frosting. A mixing bowl containing the icing is mounted on a company-designed, portable frame, which can be used for different size bowls. Icing is then pumped from the bowl through a short rubber hose to a spreader bar. This bar, mounted directly over the depositing line, has shut-off valves on each of four outlets. Thus, the number of ribbons of icing can be varied to suit the type of cake being decorated.

Those Other Applications

The new pump can also be used to extrude or spray jellies onto sweet goods. For extrusion, any type of spreader or depositor may be employed. And a spray gun can be used to coat the goods uniformly with jelly.

Also, Ward Baking Co., Cambridge, Mass., has an application in continuously lubricating oven chains with graphite oil. Employed is a new type pump with a built-in propeller for thoroughly mixing the lubricant in a 12-gal. container mounted on a dolly.

Connected to the pump are two hoses, with hand-operated valves for controlling flow of lubricant (under 15 psi.) through long, flush-tipped nozzles. Two men work on opposite sides of the oven, spraying each link on the chains with the lubricant.

Originally employed to spray-coat dough troughs with grease directly from drums, this versatile pump for vicous materials is made by the Alemite Division of Stewart-Warner Corp.

End (Resume reading on page 80)

Compound Coatings Find Many Uses in Candies

—Continued from page 104

coating. Specific coverage can be ascertained by experimentation.

Where an oil has been used to dissolve the color, the cooled, finished solution can be poured into clean, dry, brown-glass bottles and used as a stock solution.

Instead of using fats or oils, propylene glycol (National Formulary) can be employed to make a 3 percent solution.

For water-soluble colors, an emulsifier such as lecithin (3 percent) must be added. Emulsification is aided by vigorous stirring.

For deep shades, 1 oz. of a 3 percent color solution will tint about 30 lb. of compound coating. Lighter shades can be produced by adding the same amount of color but increasing the amount of coating (up to 60 lb.) until satisfactory results are obtained. Thereafter, uniform depths of color can be obtained each time by using the same proportions of coating to color solution, provided the color solution is properly stored to avoid fading.

Flavor and color blending can be done in one operation—by merely adding the required amount of flavor to the measured volume of color that is to be incorporated into the compound coating. Any flavor can be used that will not clash with the milk flavor of the coating or the flavor of the centers.

Preparing Equipment

When compound coatings of ivory tint or pastel shades follow a run of regular chocoate coatings, the machinery and equipment must be thoroughly cleaned. Residues of chocolate left in a coating machine will dull and muddy up the delicate colors of the compound coatings. For chocolate- or cocoa-flavored compound coatings, this is not too important, provided not too much of the regular coating (which may be of lower melting point than the compound) remains on the equipment.

To clean the equipment, pure vegetable fat of the same kind as in the compound coating is introduced into the tanks after the bulk of the regular coating has been removed by draining and scraping. Sufficient vegetable fat is added for the pumps to handle. Heat is applied to melt the fat, which is then circulated through the machine until all chocolate residues have been taken up by the fat.

The "clean-out" fat is then removed from the machine and set aside to be used in compound coatings or in any fat-containing, chocolate-flavored confection—fudge, caramel, and the like.

Applying Compound Coatings

Those coatings made with cocoa butter present no problem. They are handled in the same manner as a regular milk-chocolate coating. Other compound coatings, with higher melting-point fats and no more cocoa butter than that present in chocolate liquor or cocoa powder ingredients, must be handled differently. Temperature details will depend upon the melting point of the fats. Since these vary from maker to maker and from brand to brand, one set of rules cannot govern them all.

Generally, the solids in a compound coating—milk powder, sugar, higher melting point fats, and sometimes cocoa products—all contribute to changes in appearance of the molten products. Their viscosities and crystallization characteristics differ from those encountered in regular chocolate work.

Melting calls for higher temperatures, and constant stirring is necessary during handling—to the cooling and seeding stages. The mass will appear thicker and heavier than customary. Enrobing temperatures vary with the melting point of the fat, the amount of cocoa mass (if present), size of sugar crystals, and the overall degree of refinement of the compound coating.

For the best results, temperature of the pieces to be coated should be 15 to 20 deg. F. lower than the coating being applied. Cooling-tunnel temperatures do not have to be altered. However, after the coated pieces emerge from the cooling tunnel, they must be given ample time to lose their sensible and latent heat of crystallization and to set up properly. Experience indicates that a minimum of 48 hr. is necessary for this purpose.

Molding and Hand-Dipping

Use of compound coatings for molding calls for a little more care in temperature adjustment and tempering them in enrobing. Slow cooling and constant stirring are necessary for end products with high gloss. Throughout all stages, temperatures may be about 8 deg. F. lower than those employed in machine coating.

When the compound is properly seeded, it will appear thick and slushy.

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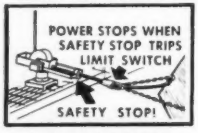

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From this point, the temperature is slowly raised until the coating will flow properly into the molds. After a 40-deg. F. cooling period (when the compound is thoroughly set), the molded pieces can be turned out in the usual way.

Hand-dipping procedures are the same as for mold work.

The foregoing techniques are applicable to the heat-resisting type of compound coating made with cocoa powder or chocolate liquor. They do not apply to that class of compound coating made only with cocoa butter, without other cocoa products. As mentioned, such material is handled as though it were a milk chocolate coating. One set of rules cannot be satisfactorily set up for each of the different combinations possible in compound coatings.

End (*Resume reading on page 105*)

Truck to Freezer—19 Min.

—*Continued from page 143*

Boxes are taken from chain at the loading station, and, after being filled from the supply belt, are replaced on the chain. They then move through blanching, cooling, and chilling to the draining station. Here the boxes are removed and their contents emptied into paper freezing containers.

Should the product need more drying, the filled metal boxes are manually removed from the chain conveyor and fed through one of the centrifuges. In either case, the filled paper containers are placed on a transverse belt leading to the overwrap machines. Check weighing is done at this point. Empty metal boxes are placed on the return flight of the conveyor which moves them to the loading section of the line.

Wrapped packages of vegetables are arranged manually in freezing trays having wooden sides and metal tops and bottoms. Then the trays are placed on the receiving shelves of the continuous-feed contact freezing unit. From here they move through the freezer and are deposited in a storage space at the discharge end. Then the containers are packed in master cartons, without the operator being exposed to other than normal room temperature.

Freezing shelves are fabricated from square tubing, each tube being independently fed with refrigerant. In this way, the entire surface in contact with trays is filled with refrigerant. Size of trays, and distance between freezing shelves, prevent bulging of the packages during freezing. The

seven contact shelves accommodate six layers of trays, a total of 1,800 lb. of product.

In operation, as a new tray is introduced, one containing frozen products is ejected from the exit end. The feed mechanism is timed to assure complete freezing of the product being processed. The time can be varied from one to four hours.

In case production exceeds the capacity of the freezer, products may be frozen by placing the trays on cold plates in one of the two cold rooms.

For processing of beans, steps peculiar to broccoli are by-passed. The vegetables enter the line at the grading belt following cleaning and cutting. From there the cycle proceeds unchanged.

End (*Resume reading on page 145*)

Apples for Top-Quality Pies

—*Continued from page 114*

It is frequent practice to use excessive amounts of sugar, spices, or other flavoring agents to overcome deficiencies in the flavor of the fruit or to mask the SO_2. Increase in the sale of apple pies will take place only with use of selected apples with good flavor and by conserving this flavor through improved handling methods.

Curbing Molds

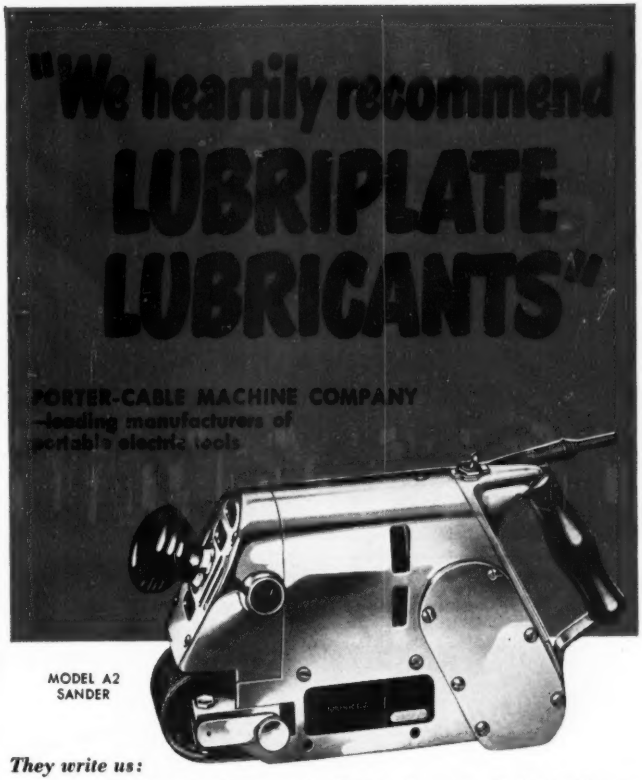
Spoilage of baked pies by molds is a major problem. Significant amounts of mold spores may be introduced into a plant by raw apples—particularly moldy fruit picked off the ground. Long-keepers should be inspected before they are put into cold storage, and all moldy fruit must be rejected.

One way to curb introduction into a plant of mold spores is to wash the fruit before delivery to the process area. However, in this case, it is necessary to guard against the transfer of mold spores from the washing room to the bakeshop. It is also advisable not to return moldy pies to the bakery.

Occasionally, molds will be found in walls, equipment, and fillings in 32 to 50 deg. F. coolers, particularly where warm fillings are loaded in.

Once introduced in a plant, mold spores spread rapidly. Christensen[10] reported the capture of mold spores on culture plates within 5 min. after they were liberated from a 1-sq.-in. culture surface on the 1st floor of a 4-story building. The culture plates were placed on the 2nd, 3rd, and 4th floors.

Spoilage of apple pies by molds and yeast can be controlled by using good sanitation and a suitable formula.



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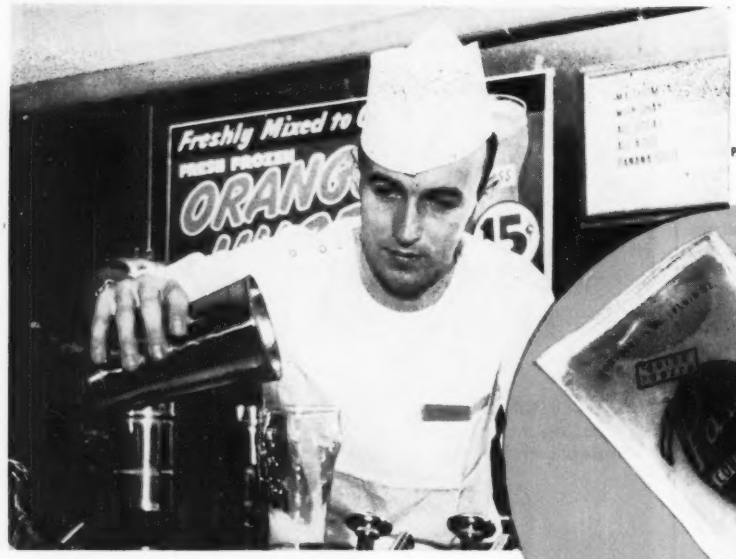

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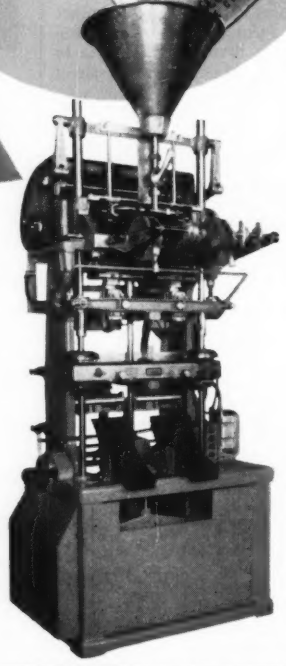

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Primary is an adequate equipment-cleaning program. If, for example, an acetic odor is detected, then it is an indication of fermentation of apple solubles or particles in equipment. In this case, this material must be cleaned out with steam or hot alkaline detergents. In any event, all equipment, conveyors, troughs, and valves should be periodically checked for evidence of apple products or molds.

Where gravity or pressure-juicing systems are employed, check the acidity or pH of the juice from the filling nozzles. This inspection may indicate contamination in tanks, pipe lines, valves, or pumps.

The formula can be altered to resist spoilage by microorganisms, particularly by changing the pH and the type and concentration of sugar and acid and by using preservatives.

Varying Sugars and Acids

Different sugars vary in their preserving properties. Tests showed the following percentages of sugars needed to prevent the growth of the yeast, *Saccharomyces cerevisiae*: Fructose, 47.5; dextrose, 50.0; and sucrose, 60.0.[12] Lactose was ineffective.[12]

Acids, too, vary in their preserving properties. Our accompanying table IV shows the amount of acids required, when used alone or in combination with sugars, to inhibit growth of *S. cerevisiae*. Of the three acids, acetic is the only one in which the concentration required to stop yeast growth is not prohibitive from a flavor standpoint.

Preservatives used in practice are sodium diacetate, sodium benzoate, benzoic acid or its deviatives, propionic acid, or proprionates.

The pH of most apple-pie fillings is below 4.0. At these low pHs, the preservatives mentioned are effective in 0.10 percent concentrations.

References

(Note: References 1-5 appear in Part I of this article—p. 182 Oct. FE.)

6. Tauber, H., *Enzyme Technology*. John Wiley & Sons, Inc., N. Y., 1943.
7. Joslyn, M. A., "Color Retention in Fruit Products," *Indus. & Eng. Chem.*, 33, 3, 308, 1941.
8. Bisno, L., "Some Considerations in Commercial Pie Baking, Pt. 3," *Bakers Digest*, June, 1950.
9. Holgate, K. and Kertesz, Z. I., "The Comparative Usefulness of Various Calcium Salts in the Firming of Canned and Frozen Apple Slices," *Fruit Prod. Jr. & Amer. Food Manufacturer*, 28, 2, 37-8, 420, Oct. 1948.
10. Christensen, C. M., "Molds and Bacteria in Flour," *Bakers Digest*, 21-23, Feb. 1947.
11. Erickson, F. J. and Fabian, F. W., "Preserving and Germicidal Action of Various Sugars and Organic Acids on Yeasts and Bacteria," *Food Research*, 7, 1, 68-79, 1942.
12. Tarkow, L., Fellers, C. R., and Levine, A. S., "Relative Inhibition of Microorganisms by Glucose and Sucrose Syrups," *Jr. of Bact.*, 44, 3, Sept. 1942.

End (*Resume reading on page 115*)

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NEW PACKAGES & PRODUCTS

New Cheese Products, Packages Take Spotlight

A popular established cheese spread in a new package and two new cheese products are now on the market.

In Polyethylene Tubes

After considerable experimentation, Sue Ann Food Products Corp., Chicago, is now merchandising its "Cocktail Delight" cheese spreads in polyethylene tubes with design-making dispenser closures.

Tubes, designed and furnished by Elmer E. Mills Corp., Chicago, are of 2¼-oz. capacity. A feature of the tube lies in the fact that if too much cheese is squeezed out, user only has to release pressure on tube and excess cheese is drawn back. Tube then resumes its original shape.

Wanting a tube that would not resemble such items as tooth paste or shaving cream made color design important. Finally, a color suggestive of each product was selected, using a background of neutral french gray. The eight spreads are identified as follows: "Edam in Sauterne", fire red; "Sharp", deep red; "Smoked", light green; "Cheddar in Port", magenta; "Roquefort in Brandy", ultra marine blue; "Camembert", brown; "Anchovy & Cheese", deep green; and "Caviar & Cheese", prussian blue.

To enable user to achieve artistic designs on hors d'oeuvres, closures designed and furnished by Braun-Hobar Corp., Milwaukee, were selected which would dispense the cheese in such shapes as a star, cross, rosette, or an "E". The caps were engineered so as to be interchangeable, thus enabling the housewife to use whichever design she prefers on any of the eight spreads. Each tube also has a sanitary seal under closure.

Spreads are merchandised so that consumer may buy individual tubes which are packaged one to a colorful folding carton, or buy a carton containing 5 assorted tubes. All cartons are furnished by American Colortype Co., Chicago. Both individual and assortment cartons are illustrated to suggest product use and give maximum visibility to tubes.

The apparent success of packaging these cheese spreads in polyethylene tubes introduces the possibility of using such tubes for a variety of other food products.

3-In-1 Cheese Blend

A new cheese product is being offered by Woody's Cheese Co., Green Bay, Wis. Called "Balgique" (pronounced Bal-geek) it is a blend of aged white cheddar, aged brick and limburger.

The company recommends that this pasteurized process cheese food, which requires refrigeration, be kept within the range of 32 to 55 deg. from time it leaves plant until it reaches consumer.

The product is packaged in an attractive self-selling 8-oz blue and ivory carton, designed and furnished by Cornell Paperboard Products Co., Milwaukee.

Yogourt Cheese Spread

With the growing popularity of yogourt in present day diets, Gaymont Laboratories, Inc., Chicago, is now offering a variety of yogourt cheese spreads. Four different flavors—aged Cheddar, onion, celery and garlic—are presently available. In addition to flavor ingredients, the product contains sweet cream, yogourt, nonfat milk solids, citrates and salt.

Spreads are packed in 6-oz. glass jars and sealed with closures, furnished by White Cap Co., Chicago.

For Package Data Use Reader Service

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Uniform quality in the glass you use is the key to reducing your glass handling problems.

To get this uniform quality, we use a system of selective inspection. We emphasize controls we know are important in producing your particular container. In this way you get glass that gives you smooth, dependable performance on your lines.

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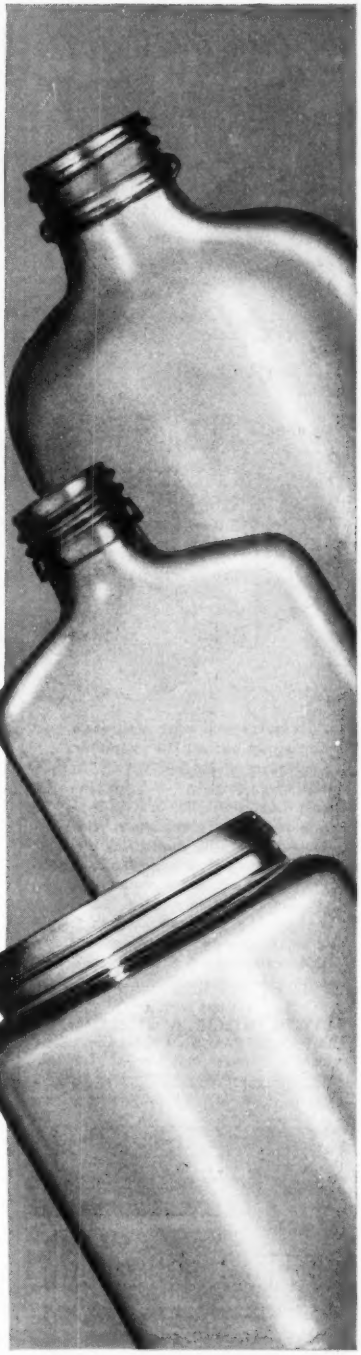
Find out how Armstrong's Glass Containers can improve the appearance of your package and boost the efficiency of your filling lines. Just contact your near-by Armstrong office or write to Armstrong Cork Company, Glass and Closure Division, 4211 Prince Street, Lancaster, Pennsylvania.

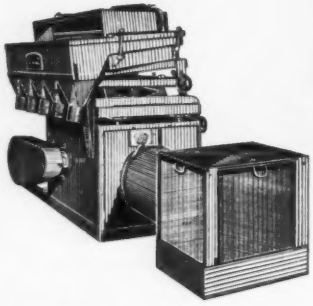


ARMSTRONG'S GLASS CONTAINERS

we can give you

58

good reasons why...



... it makes good sense to sit down and study out all the economic advantages of cleaning, classifying, and up-grading dry food products with Sutton Specific Gravity Separators and Air-Float Stoners. Upon request, you will immediately receive a list of 58 different food and cereal products, each representing a distinct separating problem solved by *"effecting a difference in specific gravity through air-flotation."* Chances are, the S S & S Process will answer your problem, too.

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SUTTON, STEELE & STEELE, INC.

Enter Quick-Frozen Chicken Pie Field

Expanding its line of quick-frozen food products, General Foods Corp., New York City, is marketing a frozen chicken pie.

Ingredients, topped with a flaky pie crust, are frozen in crimped 8-oz. aluminum containers which become attractive and convenient serving dishes for the product.

A quick one-dish meal, it is necessary merely to place the container in a preheated 425 deg. oven for 30 to 35 min., remove and serve.

The frozen pies are inserted into waxed chipboard cartons, overwrapped with 5-color lithographed wax paper, both products of Marathon Corp., Menasha, Wis. The well-known Birds Eye trademark appears on a red rectangular background, instead of the blue rectangle used on packs for frozen fruit, vegetable and poultry packages.

For Package Data Use Reader Service

Chutney Added to Line

Supplementing its present food products line, College Inn Food Products Co., Chicago, has taken over manufacture and distribution of "Calcutta Club" chutney, formerly handled by Lucullus, New York.

This is made from an authentic East Indian chutney recipe, consisting of imported mangoes, lime juice, ginger, raisins, vinegar, apples, and condiments.

The relish, popularly served with fowl, roasts, and sea foods, can also be used as an ingredient in hot and cold canapes, with cheese, vegetables, fruits, and in salad dressings, gravies, and sauces.

The container, furnished by Owens-Illinois Glass Co., Toledo, has been redesigned from the narrow-mouthed type bottle to an 8-oz. wide-mouthed glass jar, facilitating spooning out product. And, to insure the keeping quality, "vacuum-vapor" closures, supplied by White Cap Co., Chicago, are now being used. A small, but eye-appealing label, furnished by Independent Lithograph Co., San Francisco, allows for excellent product visibility.

For Package Data Use Reader Service

Color Retainer for Meat

"Seasolin", a new non-chemical color fixative to aid in developing and retaining richer color in meat products, is being offered to meat processors by First Spice Mixing Co., Inc., New York City.

Other advantages of this product, reports company, are that it reduces spoilage and increases shelf life, intensifies the desired cure color and flavor in quick-cured products, cuts drying shrinkage eight to ten percent, and prolongs color of pre-packaged items.

Seasolin complies with Pure Food and B. A. I. regulations.

"Home-Pack" Bubble Gum

Designed especially for supermarket trade, Frank H. Fleer Corp., Philadelphia, is marketing its bubble gum in a 15-piece pack. It was formerly sold a penny apiece. The company believes this move will up sales appeal.

The multi-packages lend themselves to better display possibilities, consequently giving them an impulse buying feature.

Working with Jim Nash, New York City, the company selected a package in which 15 pieces, backed on cardboard, are overwrapped with gaily designed cellophane, product of Nashua Corp., Nashua, N. H. No change was made in the individual pieces which are wrapped in heavy white waxed paper carrying large ovals in red, blue, and green, bearing the words "Dubble Bubble", with "Fleer's" appearing in red over the top.

The overwrap carries out the theme of the individual pieces in addition to a wide diagonal band in fireman red. On this band the phrase, "Fun with Gum", is in bold white lettering, accentuated by a black cast shadow. There is also a white circle for price marking and the words, "15 comics" in black, referring to the fact that a comic strip is wrapped with each individual piece.

For Package Data Use Reader Service

MORE PRODUCTION from each PRODUCTION DOLLAR

An immediate way to realize more production per manhour—and at minimum investment—is by the installation of CM Electric Hoists. By making use of non-productive overhead space you can speed the flow of parts and assemblies... raise employee efficiency levels... reduce fatigue. As anyone can operate these CM Electric Hoists, skilled manpower is released for other production operations. Valuable floor space is made free for added production. Here are two CM electric hoists favored particularly by plant production executives.

CM METEOR Capacities: ½ to 5 tons

Low headroom wire rope electric hoist for heavy duty service. Single and two speed models. Push button control. High efficiency airplane type cooling. Helical gears. Fully enclosed operating parts. Precision bearings at all rotating points. Plain, geared or motor driven trolleys.

CM COMET Capacities: ⅛ to 2 tons

Portable, compact and rugged electric chain hoist. Available in push button and pendant rope control models. Equipped with flexible HERC-ALLOY load chain. Fully enclosed working parts. Upper and lower safety limits. Permanently lubricated. Plug in on 110, 220 or 440 volt power line. Used extensively in production operations.

● **CM Electric Hoist Catalog** sent on request with prices and name of your local CM distributor. Production executives find our catalog a good source of hoist information.

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"...add a pinch OF DOW CORNING ANTIFOAM A"

In laboratories or in commercial production and packaging, Dow Corning Antifoam A saves time; saves productive capacity now wasted on foam; eliminates overflowing and fire hazard; improves the finished product.

In rendering animal fat, for example, trace quantities of Dow Corning Antifoam A control foam, increases tank capacity and reduces loss of product by permitting more rapid heating. And the consumer gets a finished product that serves as a more "spatter-proof" vehicle for deep-fat frying.

Heat-stable and practically inert physiologically, Antifoam A is generally effective at concentrations ranging from 1 to 200 ppm. It can be used as received or dispersed in a solvent.

DOW CORNING SILICONES

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Send for Free Sample

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Dept. No. BF-23, Midland, Mich.
Please send sample of [ ] Antifoam A

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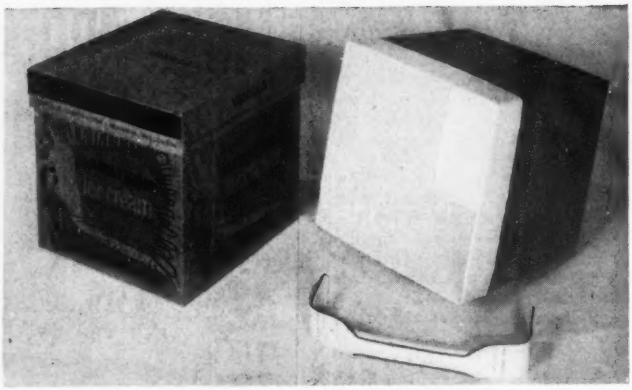


Square Bulk Ice Cream Pack in 3½-Gal. Size

A revolutionary development in bulk ice cream packaging, in the form of a square 3½-gal. ice cream container, was recently announced.

Called "Rigid Square-Pak", it is the result of a program of research and study of market needs carried out jointly by International Paper Co., Containers Div., New York City, manufacturers of the container, and Marathon Corp., Menasha, Wis., which is merchandising it.

It is made of a specially designed corrugated paperboard (for strength) with a wax treated, bleached Kraft liner (for protection and cleanliness). It has three parts—the square container, a bottom insert, and a separate top. A special plastic gripper is supplied for handling containers in cabinet storage compartments.

Some of the advantages claimed for this new-type carton include the following:

For the ice cream manufacturer—Designed for existing equipment its three parts are shipped and stored flat; single operator can handle set-up and filling at 600-700 per hour; strong sidewall will not bulge when filled; hardens rapidly to proper texture; and permits 20 percent expansion in truck capacity (or holdover cold room) with better and firmer stacking.

For the retailer—A 40 percent increase in cabinet storage space; elimination of "spin" when scooping; and easy disposal.

For Package Data Use Reader Service

Cocktail Wienies 'n Sauce

Making quick preparation of the important appetizer tray at cocktail hour possible, Oscar Mayer & Co., Chicago, offers a 9-oz. can of cocktail wieners with a sack of sauce.

The can contains 6½ oz. (approximately 21) small cocktail wieners and a separate 2½-oz. Pliofilm bag of spicy sauce.

Suggestions for serving, given on the label, state wieners can be broiled, grilled, or placed in boiling water for 4 min., after which a toothpick is inserted in each wiener and arranged on a platter. Sauce is taken from bag, heated, and then poured into a small bowl and placed in center of cocktail platter. Both wieners and sauce may also be served cold.

Southern Hushpuppy Mix

The hushpuppy, a traditional food of the South, can now be enjoyed in other localities. Hushpuppy Corp. of America, Inc., Charlotte, N. C., has developed and is marketing a **mix** under the label, "Thompson's Fireside Hushpuppy Mix".

This mix, the principal ingredient of which is corn meal, is quickly prepared by merely adding water to make

a batter. Then, dropping ½ teaspoonful at a time in deep fat, the results are small, golden-brown balls of hot bread.

The product is packaged in a round 8-oz. fibre container with metal ends. Label is attractively designed in red, white, blue, and yellow, and carries instructions for preparing hushpuppies, together with additional recipes for pancakes, corn-sticks, muffins and spoon-bread.

California Grape Juice

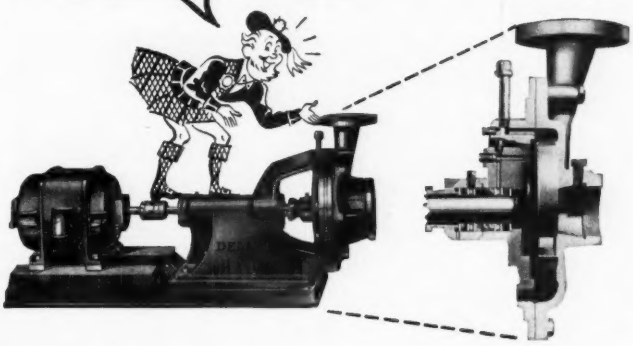
A complete new line of grape juices and concentrates are being introduced by Muscat Cooperative Growers, Anaheim, Calif., under the well-known "Anagold" label.

Included are a highly concentrated red grape base, available either frozen or non-frozen in 6-oz. cans, and a non-concentrated white grape juice in 6-oz., 12-oz., and 46-oz. ready-to-serve containers.

A feature stressed in the concentrated juice is the fact that each 6-oz. can makes a full quart when reconstituted as against the conventional 1½ pints.

THRIFTY PUMP

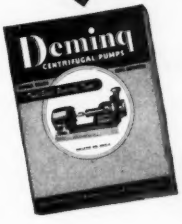
Separate Liquid End saves you money on first cost and upkeep cost!



Deming Fig. 4012 Side Suction Centrifugal Pump. Two Ball Bearing Type with Separate Liquid End.

Why incur the unnecessary cost of special alloys for an entire pump when the Deming Fig. 4012 can be furnished with only the separate liquid end of special alloys for pumping corrosive liquids? Obviously, this separate liquid end serves the dual purpose of saving you money on first cost and future upkeep cost.

SEND FOR BULLETIN NO. 4012-A



NEW ADDITIONAL FEATURES

The two ball bearings of this pump are located in the support head—away from the pump end—and are not affected by the liquid being pumped.

The semi-enclosed impeller is statically and dynamically balanced to assure smooth operation. The impeller is adjustable so that the clearance between it and the casing face can be increased or diminished to obtain maximum efficiency.

Deming Fig. 4012 Centrifugal Pumps are made in sizes from 1" to 10" discharge with capacities from 10 to 3600 gallons per minute. Regularly furnished with electric motor, these pumps can also be equipped for belt or with gasoline engine.

Complete details including performance tables are covered in BULLETIN No. 4012-A. Write for free copy.

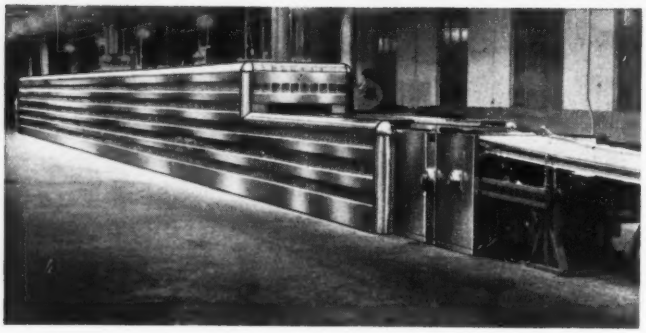
THE DEMING COMPANY
556 Broadway • Salem, Ohio, U. S. A.

DEMING DEPENDABLE PUMPS

Advance Ovens and Conveyors

for BAKING • TOASTING • HEATING • DRYING • STERILIZING

APPROVED BY USERS FROM COAST TO COAST

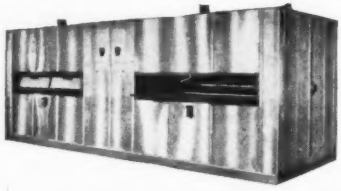


• ADVANCE TUNNEL OVENS AND CONVEYORS—with Advance-Design features that mean increased production at lower cost:

- Controlled Top and Bottom Recirculated Heat.
- Direct or Indirect Firing (Oil, Gas or Electricity).

Conveyors of Swedish steel or wire mesh band. Chain and roller drive. Electronic self-aligning design.

• ADVANCE REVOLVING OVENS—Uniform, dependable production. Available in 12 sizes. All-steel and aluminum construction with drop-type doors, safety pilots, electric ignition. Choice of stainless steel, porcelain or aluminum exteriors.



WRITE for complete information

ADVANCE

OVEN COMPANY

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MANUFACTURED IN CANADA BY FORT ENG. & SALES, LTD., MONTREAL

French-Style Onion Soup

After five years of research, Thomas J. Lipton, Inc., New York City, has added a dehydrated onion soup mix to its already popular noodle and tomato vegetable.

It is said the meaty full-bodied flavors of beef stock, combined with the golden-brown roasted onions, make it a savory and nourishing product, reminiscent of the celebrated French-style onion soup.

Not only does it offer the consumer an appetizing dish, but the simplicity of preparation which requires only 10 min., plus convenient handling and storing, present a definite sales appeal.

The soup mix is packaged in 1¼-oz. heat-sealed, aluminum foil envelopes, furnished by Reynolds Metals Co., New York City.

For Package Data Use Reader Service

Package & Product Shorts

Bag Header For Transparent Bags

A heat-seal label paper developed as a bag header or topper for transparent bags in the food and candy field has been announced by Nashua Corp., Nashua, N. H. It is recommended in wrapping vegetables, butter, shortening, poultry, fish, and other foods, where there is both a grease problem and a high degree of liquid moisture.

Seasoners and Preservatives For Meat

Two new products have been added to the present line of Butchers Friend Co., Des Moines, Iowa. "Blen-O-Flavor" is a sausage seasoner and conditioner, and "Tasty Keeper" a ground meat seasoner and preservative.

New Cake Mixes Announced

The G. A. Goodrich Co., Chicago, is now introducing a line of cake mixes under its own "Good-N-Rich" brand name.

New Strained Baby Food Marketed

Gerber Products Co., Fremont, Mich., has added an easily digestible banana puree in the form of a smooth custard to its present line of baby foods.

For Package Data Use Reader Service

—*End*—

Engineering Quality Pectins

—*Continued from page 89*

and approximately 30 lb. of ammonia are pumped into washer. Ammonia neutralizes any residual hydrochloric acid and a sufficient number of the free carboxyl groups of the pectin so that the final dried product will have a pH of 3.6-4.2 (1.0 percent solution). Pectin is at an optimum for stability when its pH is in this region. Although this operation is referred to as "buffering," it is, in the strictest sense, merely partial neutralization.

Arbitrary spot-plate color standards and glass electrode values in the alcoholic slurry aid the operators in adding the correct volumes of ammonia. The washer is rotated for about 30 min. And when the slurry tests at 4.0 pH, the liquid is filtered to the No. 4 receiver which drains into the second-rinse tank. It is then given one 5-min. rinse with redistilled alcohol and a final 5-min. rinse of fresh (100 percent) alcohol which removes any ammonium chloride remaining in the material.

After these two rinses, the alcohol is drawn off by No. 4 receiver and drains into the second alcohol rinse-tank. Fresh isopropyl alcohol (100 percent) is pumped into the system at this point from a storage tank, becoming the replacement that balances losses and keeps the system full.

Dried in Two Stages

The pectin, which has a moisture content of about 60 percent, is then dumped from the washer into a buggy and moved to the two-stage vacuum dryer. This stationery batch-type, water-jacketed unit operates under 20-25 in. vacuum. A heat exchanger, using 15 psi. steam, supplies hot water at automatically controlled temperature.

A central shaft with an interrupted-ribbon-type agitator moves the pectin from the center of the dryer (the point at which it enters the unit) to each end, and then returns it to the center. It remains in the primary stage at 77 deg. C. for about 3 hr., at which time its moisture content is reduced from 60 to about 30 percent.

This partially dried pectin is dumped into the secondary stage of the dryer and the first stage is refilled. At the same temperature and approximately the same time its moisture is reduced to 7 to 10 percent. A scroll conveyor then moves the dried pectin to a storage bin.

Product Screened

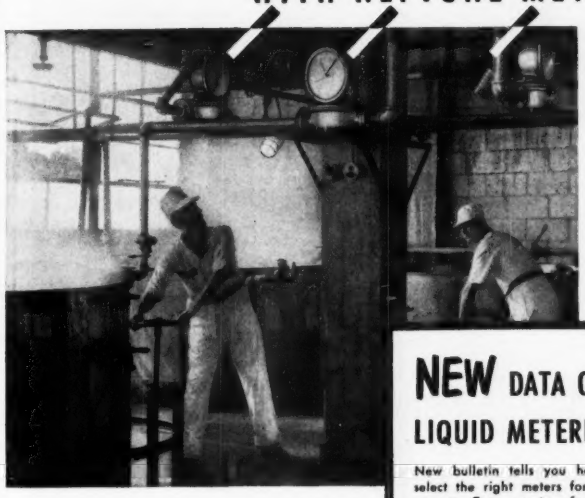
From storage bins, pectin is conveyed to a hopper and fed by gravity to a screen, which is part of a closed recirculating grinding system. Two Selectro screens, a No. 14 and a No. 60 mesh, are used for size-grading the pectin particles. Coarse material remaining on the No. 14 is returned to the extraction process. That retained on the No. 60 is chuted to a Fitzpatrick hammer-mill for grinding. That falling through the No. 60 is collected and barreled as finished unstandardized product. The two mills operate at 7,000 rpm. and have a daily capacity of 2 tons.

From here, the pectin is recircu-

CATSUP FOR A BILLION HAMBURGERS

Quality Controlled

WITH NEPTUNE METERS



The G. S. Suppiger Company makes 30,000,000 bottles of Brooks catsup a year —catsup with a carefully controlled "tangy" flavor — not sweet — not biting — but "just right." Accurate measurement of liquid sugar and other liquid ingredients is vital —accurate measurement delivered to batch after batch by the fine-instrument precision of the three Neptune Meters shown above.

In plant after plant Neptune Meters are the key to quality control. They pay for themselves by eliminating spoilage, spillage, and the unsanitary muss and fuss of gauge sticks, pails or batch tanks. Use them for accurate cost accounting and inventory control, too. Positive displacement type, simple in design, quality built for sustained accuracy. Many types available for handling over a hundred different industrial liquids.

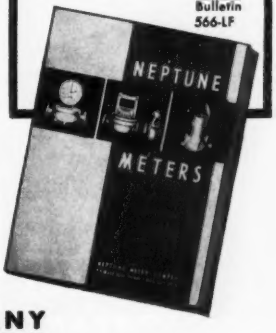
NEW DATA ON LIQUID METERING

New bulletin tells you how to select the right meters for your process. Covers meters for handling more than 100 industrial liquids—hot or cold water, oils, syrups, brines, soap solutions, scores of chemical solutions, etc. Shows meters from ⅜" to 6"—from simple horizontal straight-readers to the newest 432 Auto-Stop automatic batching meters. A gold mine of information for processing engineers!

Get Started Now!

Write for it—it's free. Ask for it by number:

Bulletin 566-LF



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find the Solutions with TEFLON

These and many more problems in food processing, are being solved with TEFLON*, duPont's new wonder plastic fabricated by the United States Gasket Company.

Keep these unique Teflon properties in mind. It is inert to all food acids, alkalis, detergents; non-contaminating, tasteless, odorless; non-absorbent, bacteria resistant, easily cleaned; tough, resilient, long-wearing; non-flammable; serviceable from —110°F. to 500°F.; has an extremely anti-hesive, slippery, waxy surface.

Consider it for pump impellors that won't gall and freeze on the most difficult solutions. For no-lubricant, non-contaminating bearings and pump and valve packings. For non-contaminating, durable gaskets, expansion joints and accessories for glass and stainless steel piping. For covering header rolls on bakers dough sheeters, etc. For permanent candy molds to replace starch. For sanitary work surfaces and coverings for conveyors, guide rails, trays, etc., that wipe clean of the stickiest substance, quickly and easily.

Teflon is available from the United States Gasket Company in sheets, tape, engineered packings, cut and molded gaskets and covered rolls.

Ask for catalog or tell us your requirements.

UNITED STATES GASKET COMPANY

FLUOROCARBON PRODUCTS DIVISION

FABRICATORS OF "TEFLON", "KEL-F" AND OTHER FLUOROCARBON PLASTICS

CAMDEN 1, NEW JERSEY

*duPont's trademark for its tetrafluoroethylene resin

lated by air-conveyor. A cyclone removes it from the conveyor air-stream and drops it into a screw-conveyor that returns it to the two screens. Surplus air leaving this system passes through sock-filters, and pectin dust drops from these into barrels and is returned to the extraction process. The granular product is recirculated in this system until it passes through the two screens.

A scroll conveyor then moves it to the blender feed-hopper. Batches of 2,400 lb. are blended, then chuted to the packaging department for filling into barrels. The laboratory analyzes each batch as the pectin goes into storage for future standardizing.

End (*Resume reading on page 90*)

Keeping Orange Juice Fresh

—*Continued from page 93*

the juice flows (in a ½-in. thick stream) over a stainless steel pan.

The irradiation unit contains three lamps of 3,000w, 15 amp. each. It is claimed that, by the special design of the mercury vapor lamps, the rays that destroy vitamin C are filtered out.

Following irradiation the juice is pumped through a plate cooler, where its temperature is quickly lowered to 33 deg. F. Then it goes into jacketed tanks where nitrogen is passed through it to remove excess oxygen. This step is an added precaution to insure that no oxidation takes place that would tend to give an off-flavor.

From the holding tanks, the juice is run by gravity into 2,500-gal. stainless steel tank trucks (which have been purged with nitrogen) and sealed. Two of these trucks are now in service. Similar to those used to transport milk, they are insulated with 2½ in. of cork.

The trip to Dorchester takes about 39 hr. Temperature loss during the trip is approximately 2 deg. per 24 hr. So the juice, filled into the tank at 33 deg., arrives at about 36 deg.

At the Dorchester plant, juice is transferred to four 660-gal. storage tanks and kept refrigerated until bottled. Here, the juice is kept under a blanket of nitrogen. Bottles are sealed with nitrogen and delivered in cardboard cartons under controlled refrigeration.

Laboratory experiments have demonstrated that the irradiated juice can be kept at room temperature up to 24 hr. without noticeable bacterial development. And at 42 deg. it has been kept in good condition for seven weeks.

End (*Resume reading on page 94*)

when you buy chlorophyll ... buy american!

Sound procedure for a standardized product—buy American . . .

American Chlorophyll has been first since 1934 . . .

the first to produce a commercially available chlorophyll . . .

. . . the first to offer a chemically measurable substance.

It is these factors which have made American the largest chlorophyll producer.

Looking to the future, American has taken steps to maintain its integrity and position in the chlorophyll field with three more firsts

first by establishing more productive sources of chlorophyll.

first by step-up of the available chlorophyll by markedly increasing the capacity of the world's largest producing plant.

first by a weighty research program under impartial investigators in leading institutions.

american chlorophyll DIVISION

LAKE WORTH, FLORIDA

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You Asked for SPEED . . . for ACCURACY . . . Choice of TOTAL SOLIDS, INDEX SCALES and BUTYRO . . .

You Get *All Three* in the

WORLD'S FASTEST REFRACTOMETER

Featuring

"STOP-WATCH" SPEED!

±.0001 **"LABORATORY" ACCURACY on the PRODUCTION LINE!**

- *Super Speed Readings* . . . from ALL NEW DESIGN! Want analyses in 10 seconds? 15 seconds? You can have the speed your process requires. *No more losses of time, materials and money due to slow readings!* This new Bausch & Lomb *Industrial* Refractometer is strictly a *production* instrument . . . designed and built for use right beside your vats. You'll want several . . . at least one for *each* testing area.
- *Super Speed Loading* . . . new prism design.
- *Super Speed Cleaning* . . . prisms easily, quickly cleaned. Prevents contamination of new samples. Internal parts protected from dirt, fumes, stray liquids.
- *Super Temperature Stability* . . . easier to maintain stable temperatures.

Plus dependable, uniform accuracy of ±.0001. Simplified to basic essentials . . . operated by any average worker. Scales "tailor-made" to seven specific ranges industry requires.

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Please send me complete information on the New Bausch & Lomb Industrial Refractometer.

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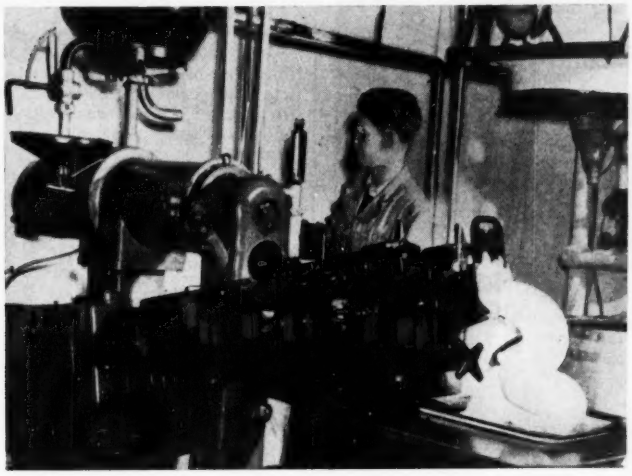
ADVANCES IN TECHNOLOGY



Find Fritz Continuous Butter Making Machine Unsuited for Use in Canadian Industry

Tests conducted by scientists at the National Research Laboratories, Ottawa, Canada, have shown that butter made by the Fritz process cannot meet the legal standard of 16 percent, or less, water. They also found it impossible to incorporate salt in the product.

A Fritz machine, designed to produce up to 3,000 lb./hr. of butter containing up to 20 percent moisture, was studied over a 4 year period. Some 350 trials were made. Production rate varied from slightly less than 300 to over 3,000 lb./hr.

In an effort to reduce moisture content of the butter mechanical alterations were made in the machine, and the following were varied: Fat content of cream; acidity after neutralization; temperature of pasteurization; length of holding time between pasteurizing and processing; temperature of cream entering the machine; and temperature of cooling fluid in the jacket. Slowing the speed of working screws did produce butter of lower moisture content, but it reduced production rate greatly.

Addition of salt as a concentrated brine was not practical because it introduced large amounts of water, and dry salt failed to dissolve, giving a mottled appearance to the butter during storage.

Digest from "Assessment of the Fritz Continuous Butter-Making Machine For Canadian Use," by J. A. Pearce, D. Rose, and H. Tessier, *Canadian Journal of Technology*, 167-77, July-Aug. 1952.

Pasteurizing Concentrated Milk

Little more heat is needed to pasteuriae concentrated whole milk than is required for single strength whole milk. This is probably due to the low pH, and certain other properties developed during its manufacture, that overcome any protection afforded bacteria by the high solids present.

Experiments were conducted with commercial (3:1) concentrated whole milk furnished by companies in Chicago, Washington, and Wilmington, Del. Samples were taken after condensing but prior to pasteurization. They were pasteurized in the laboratory at a series of temperatures for 30 min. and 15 sec. to determine the temperatures required to obtain bacterial destruction equivalent to whole milk pasteurized at 143 F. for 30 min. and 161 F. for 15 sec. Pure cultures of MS18s were used.

Temperatures of 142.8 for 30 min. and 163 for 15 sec. were found to effect bacterial destruction in the concentrated milk equal to that in whole milk at 143 and 161 F., respectively. Because of possible experimental errors, however, temperatures of 144-45 F. for 30-min., and 165 F. for 15 sec. were recommended for proper pasteurization of concentrated whole milk.

Digest from "Pasteurization Requirements for Concentrated Whole Milk," by C. A. Grosche, H. L. Lucas and M. L. Speck, *Journal of Dairy Science*, 793-99, Sept. 1952.

FRUIT

Preparing Crystallized Fruits

A method of making glace fruits by simply steeping them in concentrated sucrose syrup followed by drying to the desired moisture content has been developed by the Div. of Food Preservation & Transport, Homebush, N.S.W.

Steps involved in preparing fruit are: Inspecting, peeling and pitting, size grading, and blanching. Syrup should be about 67 deg. Brix. For some fruits such as pineapple, pure sucrose syrup is recommended. For others, a mixture of 60 percent sucrose, 10 percent invert has proved suitable.

Steeping should be for about 16 hr. (overnight) at 120-160 F. followed

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by draining. Potassium metabisulfite (0.15-0.25 percent) is incorporated in the syrup to produce a 500 ppm. SO_2 level in the glace fruit. This is necessary to prevent darkening and spoilage during storage.

Fruit should be dried to 23-25 percent moisture. A conventional cross-draft dehydrator, operated at a temperature of 140 F. was found satisfactory. To prevent stickiness, particularly when high invert concentrations are used, a coating of low ester pectin has shown promise.

Digest from "Preparation of Sugared Fruits," *The Agricultural Gazette*, (Published by Dept. of Agr., New South Wales, Sydney, Australia.) 301-3, 315, June 2, 1952.

SANITATION

Contamination of Foods Due to Process Aids

Use of insecticides, fumigants, and processing aids such as silicone pan greases, mineral oil lubricants, plasticizers in wrapping films, and quaternary ammonium detergents and bactericides, present problems to the food industries. Three specific problems arising from the use of organic chemicals for these purposes are: (1) Extent to which such materials are absorbed by foods during processing; (2) Effects such residues may have on the processing of the food itself, and (3) Difficulty of determining by ordinary chemical means the extent of the contamination.

Extraction of mineral oil from bread by carbon tetrachloride is aided by the presence of fats. When bread has been made without shortenings, and the mineral oil concentration does not exceed 0.35 percent, only about 30 percent is recoverable by CCl_4 extraction. When fat has been added to the dough, up to 84 percent of the mineral oil is extractable.

Under regulations in the United Kingdom, up to 0.2 percent of mineral oil is tolerated in bread, but the correctness of the quantities obtained on analysis obviously depends on some knowledge of the bread's composition. Benzene extraction of DDT from flour or bread is subject to the same limitations—up to 40 percent of the DDT present can remain unextracted in certain cases.

Gammexane (benzene hexachloride) is less toxic than DDT and is therefore considered safer for use as a spray where foods, particularly fatty ones, can be contaminated. Gammexane is an inhibitor of yeast action in synthetic media. In whole meal or long extraction flour, 5 ppm. can affect loaf volume; white flour loaves are not measurably affected.

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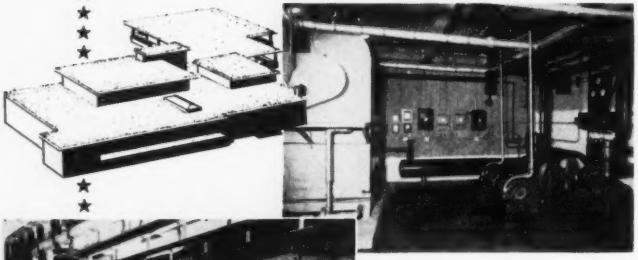

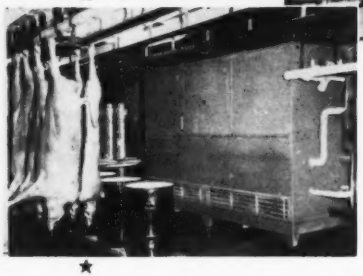

The compressors, evaporative condenser, and liquid receiver in the machinery room are all Vilter products.

Vilter Brine Spray units cool the Lundy chilling and holding rooms. Automatic controls for both temperature and humidity are used here.

• The Lundy Packing Company was established in 1950 both to provide a new industry for Clinton, and to promote the raising of livestock throughout eastern North Carolina. At the present time, the Lundy plant processes hogs, and produces lard and other by-products.

Vilter refrigeration in the Lundy plant provides cooling and humidity control for the chilling and holding rooms, and cools a direct expansion lard roll. Operation of the Vilter compressors is automatic. The proximity of the Vilter Evaporative Condenser to the compressors adds to the savings of this thrifty Vilter unit.

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while effective bactericides are extremely difficult to remove from glass surfaces. They are readily absorbed by fats which also tend to inhibit their bactericidal effect. Because of their lysine effect on red blood corpuscles the ingestion of foods containing quaternaries is not without hazard. The concentration of 1:6400, often used for sterilizing rinses of beer glasses, can not lead to more than 1 ppm. of the quaternary in a glass of beer with normal usage of the material. Multiple use of glass or glass-lined containers disinfected with quaternaries, can lead to much higher concentrations.

Plastic wrappers are not likely to be toxic as far as the film itself is concerned, but the large variety of plasticizers used in wrapper preparation has not been evaluated pharmocologically. Some are not suitable for fatty foods (lard, bacon, oleomargarine), but are suitable for non-fatty foods (fresh vegetables, frozen foods, etc.).

Digest from "Analytical and Pharmacological Problems Arising from the Use of Organic Chemicals as Processing Aids and Hygiene Aids in the Food Industry," by J. B. M. Coppock, *Journal of the Science of Food and Agriculture*, 115-122, March, 1952.

MEATS & FISH

Quick Cured Bacon Has Better Color

Immersing in 55 deg. pickle for 24 hr. at 120 F. produces a cured bacon that has a brighter color than the dry cure product. And its palatability is equal to that of the dry cure bacon.

In a series of tests designed to determine the optimum strength of pickle, temperature, and time required for an accelerated cure for bacon, pickle strengths were varied from 55-95 deg., temperatures from 115-125 F., and times from 18-30 hr.

Bacons cured at 120 F. in 55-65 deg. pickle were very similar, and the most acceptable of the group. Of the two treatments, the 55 deg. pickle was preferable.

Bellies cured for 18, 24, and 30 hr. were very similar, but the 24-hr. treatment was considered better adapted to commercial use.

Digest from "An Accelerated Cure for Bacon," by V. K. Johnson and Sleeter Bull, *Food Technology*, 354-58, Sept. 1952.

Fish That Tastes Like Meat

A fish product in which the typical taste is changed to one resembling meat is the object of a recent patent.

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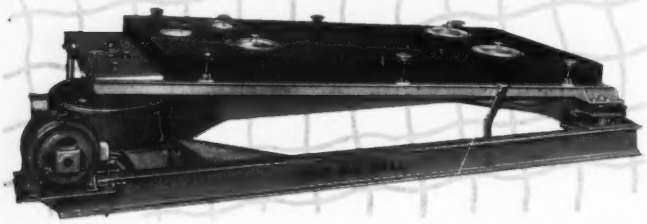

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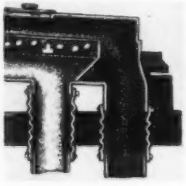

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by centrifuging or solvent extraction. Oils and fats are hydrogenated to destroy taste-imparting components, blended with protein aceous soybean extract or sodium glutamate, and re-added to the fish base. Final product may be packed in jars and cans and hermetically sealed, further dried and canned, or smoked and packaged.

Digest from U. S. Patent 2,605,184, issued July 29, 1952, on an application dated March 25, 1952, to A. Osbourne, Cabin John, Md.

STORAGE

Removing Accumulated Vapors From Fruit Storage Rooms

That ozone may be used to remove ethylene from fruit storage rooms is indicated by a recently completed study.

A batch system was used to introduce desired quantities of C_2H_4 and O_3 into a stream of purified air. The mixture was passed through a reaction vessel maintained at 32 F., then through 50 percent H_2SO_4 to remove carbon-containing reaction products, and, finally, burned in a silica furnace packed with copper oxide. Resulting CO_2 was determined by absorption and titration in standard barium hydroxide. Differences between C_2H_4 added and recovered showed that O_3 reduced C_2H_4 concentration well below the danger point for storage of apples.

Since high ozone concentrations cannot be tolerated in fruit storage rooms, the air must be passed through a bed of charcoal before it is returned to the room. An additional gain from this treatment is the removal of heavier volatiles and reaction products by the charcoal.

Digest from "Removal of Ethylene From Storage Atmospheres," by J. W. Colbert, *Refrigerating Engineering*, 265-67, 306, March, 1952.

FATS & OILS

Oil Content of Oilseeds By New, Quick Test

A new method for determining oil content of soybeans that is rapid enough for inspection of individual lots as they arrive at the processing plant, and simple enough to be performed accurately by operators without technical training, has been developed by USDA researchers. Its use for other oilseed crops is indicated.

Samples are prepared by drying to below 14 percent moisture in an infrared cabinet, then grinding to a very fine state in the presence of a special solvent. Oil content of the solvent-oil mixture is determined with a high-

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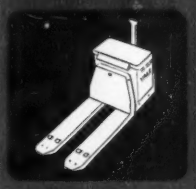
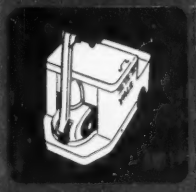
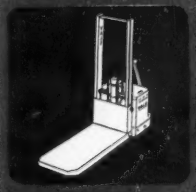


Pallet Worksaver



Tractor Worksaver



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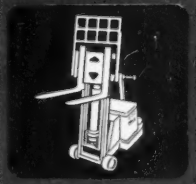

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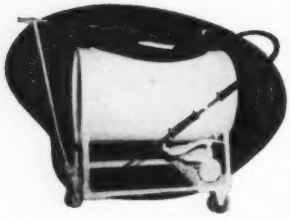

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frequency oscillator which measures the impedance of a dielectric in the test cell of the instrument.

It is estimated that 2 analysts working with 2 grinder-extractors and 1 electronic tester can analyze 20-30 samples per hr. This compares with approximately 6 hr. per sample by the standard method. Coefficient of correlation between the new and standard methods was found to be +0.98. Cost of equipment is approximately $1,000.

Digest from "Oil Content By Electronics," by W. H. Hunt, M. H. Neustadt, J. H. Hart, and L. Zeleny, *Marketing Activities*. (Published by USDA Production & Marketing Adm. Wash. 25, D. C.) 3-5, July, 1952.

BEVERAGES

Caustic Requirement For Sterile Bottles

To test the minimum washing requirements for obtaining sterile beverage bottles, a mixture of 30 ml. of lager beer and 10 ml. of first wort was inoculated with a mixed culture of the molds, yeasts, and bacteria that flourish in bottled beverage, and the inoculum poured into bottles which were then incubated for three weeks. Then the bottles were rinsed with cold water twice, and soaked in washing solutions made up of caustic soda of different strengths, with trisodium phosphate and sodium polyphosphates added.

Exposure to 1 percent Na OH for 10 min. at 158 F. was required to produce complete sterility in the bottles. Addition of a wetting agent helped remove the dried mold films. Use of a 0.01 percent sodium alkyl sulfonate (Teepol) reduced the causticity requirement for sterile bottles from 1 percent to 0.75 percent.

Caustic losses due to excessive foaming of the solutions containing the wetting agent, can be avoided by the use of an anti-foam, or the wetting agent can be added to the fore-rinse water, though the effect on bottle sterility is not as good as when it is in the caustic solution.

Attention must be given to sterilizing the final rinse water for a complete solution of the problem.

Digest form "Bottle Sterilization," by E. Rohrer, *Schweizer Brauerei Rundschau*, Vol. 63, No. 7, 123-26, July, 1952.

MISCELLANEOUS

Properties of Antioxidants

Antioxidants occur naturally in many fatty foods, and some of those now added are extensions or modifications of the natural ones. Phenols are the largest and most important class

(Turn to page 175)

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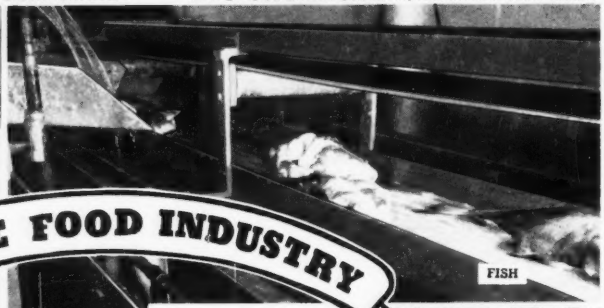
CORN



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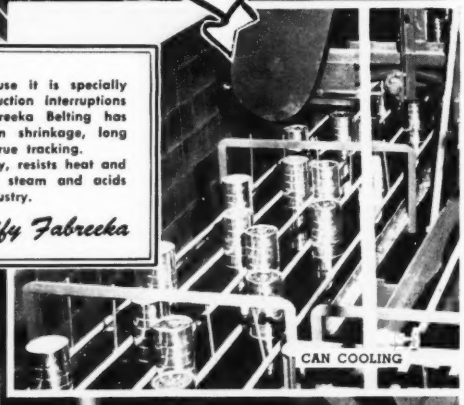
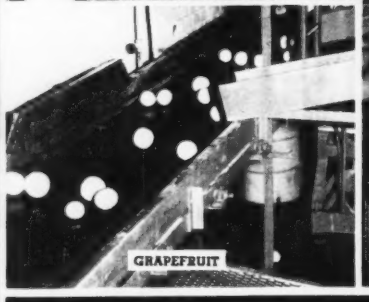
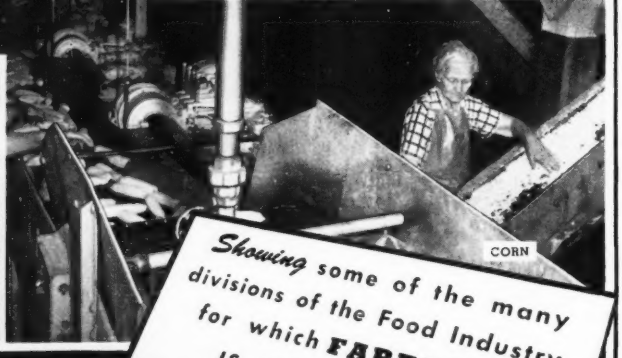


CAN COOLING



GRAPEFRUIT



CORN

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In Keeping Up With Field . . . . page 199

of antioxidants. Aromatic amines and aminophenols are equally effective and some sulphur-bearing compounds have activity. Some acidic substances such as citric or phosphoric acids, without antioxidant properties of their own, have a valuable "synergistic" effect in antioxidant mixtures.

Of the natural antioxidants, the tocopherols (vitamin E) are widely distributed in vegetable-oil bearing tissues. The dihydrocaffeic acid of coffee beans, the sesamol of sesame seed, eugenol from cloves, are other examples. Sesamol is responsible for a large part of the exceptional stability of sesame oil. The preservative value of smoke on fish and meats is partly due to the phenolic substances is contains.

Antioxidants for food uses can: (1) Stabilize essential oils against oxidation: (2) Prevent destruction of ascorbic acid and the browning of fruits, fruit juices, and vegetables; (3) Stabilize vitamin A and the carotinoid pigments of foods, and (4) Prevent or retard oxidative rancidity in dry edible fats in cooked foods.

For food use, antioxidants must be non-toxic, have good "carry-over" into cooked foods and have no appreciable flavor of their own at the level used. Ascorbic acid in both *d*- and *l*-forms is about the only antioxidant effective in aqueous systems. Butylated hydroxyanisole is reputed to have exceptionally good carry-over into baked goods. Guaiac resin has good carry-over, but in dried meats imparts some smoky flavor. Tetraalkylthiuram disulfide is said to prevent fishy odor development in butter at concentrations as low as 0.001-0.005 percent.

Digest from "Problems Arising From the Use of Chemicals in Foods: Antioxidants," by C. H. Lea, *Chemistry and Industry*, 178-83, March 1, 1952, pp. 178-183.

—End—

Revolutionizes Fat Rendering

—*Continued from page 74*

tion were investigated. A single-pass three-phase separation was found to be most successful.

The entire production unit, including pipe, has been constructed of stainless steel. The system is fully closed and—with the exception of surge tanks—is maintained under a slight pressure.

A return line pipe loops the continuous, closed-process system and permits

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Fig. 645

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in-place sanitation by a reverse flow of detergent—a technique prevalent in dairy processing where similar equipment is used. Thus, it is possible to effectively clean up the system and surrounding area in 5 man-hours.

Operating Facts

In first runs, the new system was able to process over 1 ton per hour of the beef fat—a capacity soon doubled by further refinement of equipment. Thus, in a 200 sq. ft. floor area the throughput was equal to that being handled by the standard oleo-stock rendering and clarifying setup which occupies 3,600 sq. ft.

Improvements in yield and product quality were also determined early. On beef fats, the system increased the fat yield to over 90 percent—almost 20 percent more than the industry average. And the increase in yield was almost as dramatic when lard was run.

From the very beginning, product from the system appeared to have extraordinary color and blandness. Analysis revealed a consistent reduction in the color factor, less free fatty acids, and less water content than conventionally rendered fats. But the most remarkable improvement was an almost unbelievable increase in stability—as reckoned by Swift Stability Test (AOM).

What is usually called "cracklings" consists of a water slurry containing about 5 percent by volume of solids from the prototype system. These solids are readily recoverable by centrifugal clarification, being reduced to a 50 percent moisture basis. At 5 percent moisture, the solids fraction contains better than 50 percent high-quality edible protein.

Power costs of the continuous process are but a fraction of those of conventional rendering. It has been determined that the cost of steam and electrical power for the present production unit is about 15c. per ton. Prime steam-rendered lard in wet tanks has an operating power cost of better than $3 per ton.

Many Possibilities

Implications of this development are interesting to contemplate. By reducing the "in-process" time to a matter of seconds, an extremely bland fatty material results, with a remarkably improved keeping time. Oleo stock rendered in this manner thus produces a high quality fat which suggests its reintroduction into quality margarine. And lard from this process is so completely odor-free that it may obviate the need for expensive deodorizing equipment in the small plant.

Actually, we believe that when the new rendering system is in full operation in our plant it will eliminate most refining procedures, as well as tankwater operations. Aside from space and equipment savings, it is estimated that in a large operation—where volume is 10,000 lb. of fat per hour or more—the manpower requirements for rendering, refining, and tankwater operations can be reduced by 50 percent or more.

Although we term our new system a "prototype" process, it has actually demonstrated its worth in full-scale volume rendering in our beef fat department. Based on figures already gleaned, we believe that the yield increases alone are sufficient to return the equipment installation cost in eight to ten months. This does not take into account labor and power savings, or the economics of upgraded product.

In the several weeks of operation, two men from our laboratory have managed this process in the plant. However, regular plant workers are being trained for the job and are slated to take over by the time this article is in print. Thus, it is obvious that no detailed or specialized training is necessary to manage this relatively uncomplicated new operation.

Patent applications covering the development have been made. However, to foster its possible use throughout the industry we are now conferring with one of the leading equipment suppliers to the fats and oils field and expect that a commercially engineered "packaged" version of the process will be on the market in the near future.

End (Resume reading on page 75)

"Sweets"—250 Lb./Hr.

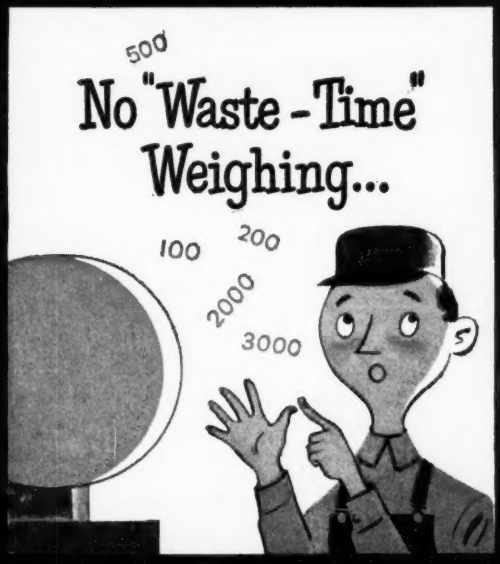
—Continued from page 97

Now, the filled rope of candy is fed to the sizer. This unit consists of four sets of electrically-heated rolls that reduce the diameter of the rope to any size (from ½ to 1¼ in.) and feed it at a maximum rate of 90 ft. per min. to the super Rostoplast—the forming and cutting machine. Projecting pins on the first set of rolls prevent slipping of the rope through the unit.

Mounted at the four-step sizer is a panel fitted with switches to enable the operator to start and stop the five machines.

Shaping the Candies

Key machine on the line is the individual candy former and cutter. Here, the rope is continuously fed to rotating drum-type dies that automati-



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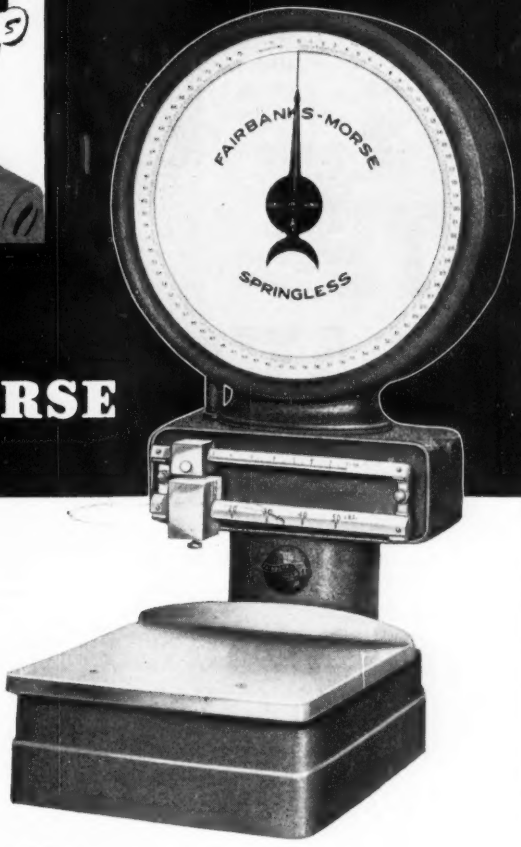

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cally form and cut it into a variety of shapes or sizes.

This unit consists of spring-operated side dies, stationary bottom cutters, and top cutters and formers that punch the rope into individual pieces. Each piece of candy, including ends, is completely sealed so that the filling does not leak from the uniform candy jacket. Changing of the dies requires only about 5 min.

Finally, the pieces drop onto a wire-mesh belt that carry them through the three-tier cooler. This unit is equipped with three belts at different levels. Each belt is progressively wider and travels at slower speeds to provide a 6-10 min. cooling period. Overall length of the cooler is 18 ft.

The belts are equipped with a series of ducts that emit blasts of cooling air on the candies. Cooled candies are discharged from the third (lower) belt at a convenient height for packing.

End *(Resume reading on page 98)*

Improved Water Treatment

—Continued from page 71

pumps, the latter delivering the battery fluid against the filter pressure.

Cost of operation is $0.18 per 10,000 gal. of which the electrolytic cost proper is about one-fourth. In the case of supplementary conditioning for alkalinity or hardness, for the assumed cases of the removal of 3 gr./gal. $CaCO_3$ alkalinity or 7.5 gr./gal. $CaCO_3$ hardness, the additional cost is $0.50 per 10,000 gal., making the total cost $0.68 per 10,000 gal.

These treatment costs are very slight compared to the value of the food or beverage product utilizing the same amount of finished water. They are also much less than for comparable chemical coagulation water treatment, particularly so in the instance of organic purification alone.

References & Bibliography

1. Roller, P. S., Pats. App. For on Apparatus and Method.
2. Buswell, A. M., and Suter, M., *Journal Bacterology*, 39, 583, 1940.
3. Castell, C. A., and McDermott, L. A., *Food Research* 7, 244, 1942.
4. Weckel, K. G., *Food Industries*, 4, 47, 1942.
5. Peele, T. C., *Cornell University Agr. Expt. Sta. Bul.* 197, Sept. 1936.
6. Karpinskaja, J., *J. Landw. Wiss.* 3, 587, 1926, cited in Peele, (5).
7. Courtris, L. R., *Bul. Assn. Diplomes Micro-Biol. Faculte Pharm.* Nancy 42, 8, 1951; *J. Amer. Water Works Assn.*, 44, 52, 1952.
8. *Standard Methods for Water and Sewage*, Amer. Pub. Health Assn. N. Y., 1946.
9. Mahin, E. G., *Quantitative Analysis*, McGraw-Hill Book Co., 426, 1919.
10. Bartow, E., Black, A. P. and Sansbury, W. E., *Ind. and Eng. Ch.*, 25, 898, 1933.

End *(Resume reading on page 72)*

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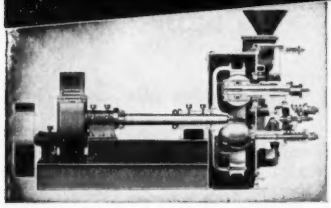

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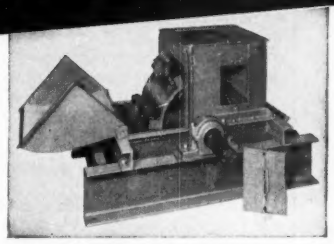

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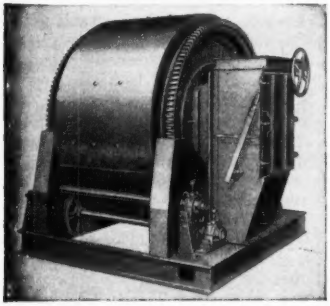

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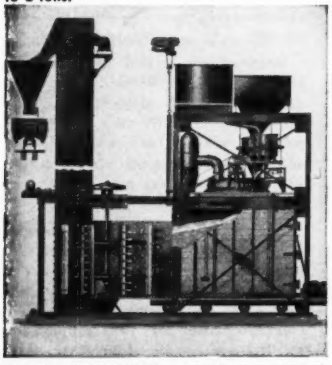

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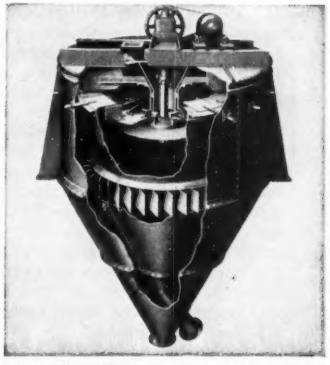

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Questions & Answers

THIS MONTH'S PROBLEM

Question—Last Fall we started to manufacture a fine line of butter-cookies with a 25-35 percent fat content. These cookies are packed in a set-up carton (1x10x10 in.) which is then overwrapped in moistureproof, heat-sealable cellophane. The cookies remained fresh and crisp during the winter months, but during the hot, humid summer months they became soggy. This condition threw our whole merchandising program out of line. Can you tell us where our trouble lies and how it can be overcome?

Answer to September Problem

The Question Was—What can we add to synthetic flavors, such as cherry, strawberry, and raspberry, and to lemon and lime oils to reduce their volatility? Trouble with these flavors is that they lose their bouquet when poured on dry sugar formulas.

Answer—This is a very real problem, and one that has been extensively studied. However, we hesitate to name a specific additive because of the rather broad patents—still in effect—that cover this subject.

It would be our suggestion that you review U. S. Patents 2,305,620; 2,305,621; and 2,305,622. Then contact the assignees about making arrangements for possible use.

These patents are based upon the principle of adding a chemical to a flavor to form a stable compound during processing and subsequent handling. Also, at the time of consumption, no losses in flavor strength should occur.

Since the granting of these patents, there has been considerable controversy over adding unneeded chemicals to food products. Therefore, you should be certain that any additive used is acceptable and harmless.

While your question specifically covers only additives, it might be well to point out that flavor losses can be reduced to some extent by processing in a low-temperature room with little air current. Thus, if you carry out operations in a sealed, refrigerated unit and put your product up in a suitable, protective package, you will go a long way toward obtaining your objective—a better-flavored product.

Further on Same Question

Another method of reducing volatility of essential oils is to dissolve them in propylene glycol—a viscous, non-toxic high-boiling point (370.4 deg. F.) liquid. By increasing the amount of propylene glycol, volatility of an essential oil may be reduced. However, since this solvent is hygroscopic, use of excessive amounts may lead to considerable caking of the dry formulations.

Glycerine is another flavor solvent that may be employed to curb flavor losses.—*Arthur S. Levine, Associate Professor, Department of Food Technology, Univ. of Mass.*

Making Fudge Mix

Question—I would greatly appreciate a formula and details on the manufacture of an instant fudge or frosting mix.

Answer—There are several excellent products on the market, consisting generally of the same ingredients used in preparing fudge in the home kitchen. Some of these mixes contain fat, and some do not.

Here's a typical formula containing fat: Corn syrup solids, 25 lb.; non-fat milk solids, 9 lb.; powdered sugar, 240 lb.; hydrogenated shortening, 25 lb.; cocoa, 20 lb.; salt, 1 lb.; vanilla, ½ lb.; and powdered cinnamon, ¼ lb.

Processing is carried out in this manner: Cream corn syrup solids and shortening. This process results in solids that are uniformly coated with a thin film of fat. To this mixture are then added the other ingredients, and the entire batch is then blended for about 30 min. in a dough mixer. Finally, the batch is screened to remove lumps, then packaged.

How Would *You* Do It?

Readers are invited to submit to FOOD ENGINEERING answers to questions in this department, especially to "This Month's Problem." Selected answers will be published, with credit (unless you specify otherwise). We pay space rates.

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To prepare this mix for use, it is only necessary to add a small amount of water and cook 3 to 4 min.

Use of corn syrup solids (spray-dried corn syrup), which contains essentially dextrins, maltose, and dextrose, imparts desirable grain characteristics and slows down drying out of the cooked product. The corn syrup solids is sold under the trade name, Fro-Dex, by American Maize-Products Co. Use of this ingredient is, however, stated to be subject to certain patent limitations.

Refer to U. S. Patent 2,210,856, issued Aug. 6, 1940 and assigned to American Maize-Products Co., N.Y.C., for formula given above and process details.

What to Do With Chicken Bones

Question—We have over 600 lb. of chicken bones daily, which we would like to convert into some food product. After the meat has been removed, the bones are cooked to make a chicken broth. Have you any suggestions on how we can derive some income from these waste bones?

Answer—To the best of our knowledge, chicken bones are currently being sold only to rendering plants for about ¾c per lb.

Frequently, the question comes up as to whether chicken bones could be used as a source of calcium and phosphorus in certain foods. As you undoubtedly know, these minerals are cheap and plentiful. Therefore, we doubt their use as such a source in dietary or other foods.

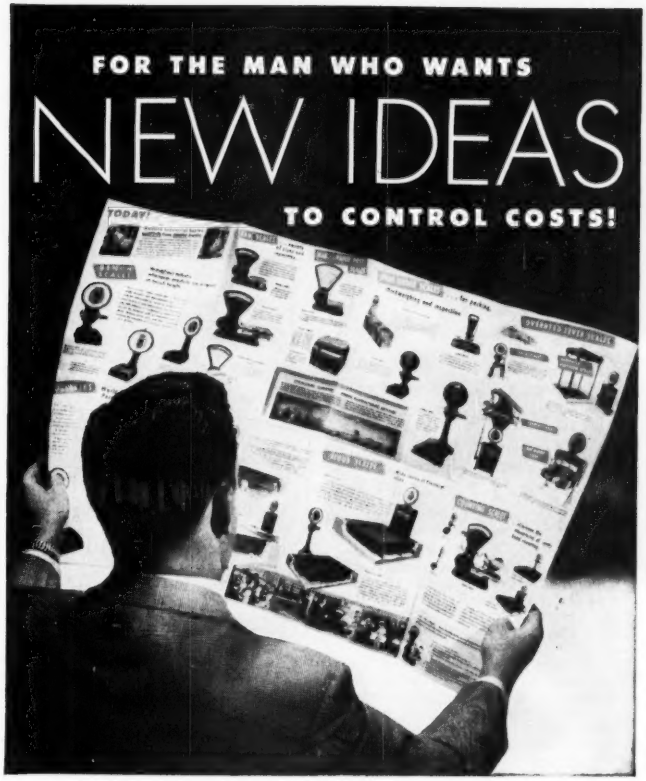
Nuts Turn Rancid

Question—We have recently developed a method of water-blanching edible nuts. Nuts treated by our new process do not become rancid. However, after the water-blanched nuts are cooked in vegetable oil, they become rancid within a short time. Do you have any comments?

Answer—During the water-blanching process, some of the oil and natural antioxidants present in the nuts are removed. Nuts treated in this manner are naturally stable.

However, when water-blanched nuts are fried in cooking oil, the fat content is much higher than the blanched product. Consequently, the nuts are more susceptible to rancidity.

Unless the cooking oil contains an added antioxidant, it is likely that the cooking oil rather than fats in the edible nut is responsible for rancidity. —*Arthur S. Levine, Associate Professor, Department of Food Technology, Univ. of Mass.*



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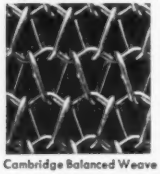

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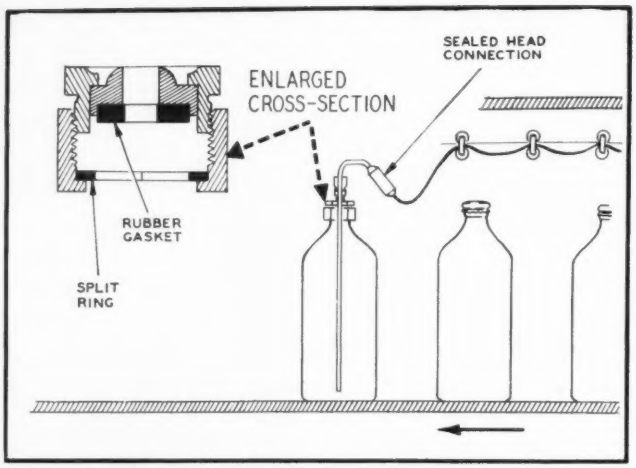

FIG. 1—SYSTEM for recording in-bottle beer temperature in pasteurizer. Cable-pulley arrangement supports the resistance bulb leadwires.

Again—Beer Temperature

Following are additional answers to the August problem on how to continuously record temperature of bottled beer going through a pasteurizer.

Answer—Recently, we worked out a method of recording the temperature of individual bottles of beer traveling through a pasteurizer at a west coast brewery. Essentially, a sensitive resistance bulb thermometer is employed to electronically measure and record the temperature of beer in a sample bottle.

The sample-bottle can is replaced by the resistance bulb, which is held securely in place by a moistureproof fitting. Temperature of the bottled beer traveling through the pasteurizer is recorded on a chart. This chart is within a multi-record recorder, mounted near the inlet end of the pasteurizer.

This single instrument simultaneously records in-bottle beer temperature for as many as six pasteurizers. A simple cable-pulley arrangement, made by the brewer, supports the resistance bulb lead wires (see Fig. 1).

An enlargement of a cross-section of the moistureproof fitting also appears in the diagram. The two-piece metal split-ring anchors the fitting against the neck of the bottle. As the threaded halves of the fitting are tightened, the rubber gasket is compressed to provide the moistureproof seal.—*L. M. Richardson, Food Industry Div., The Foxboro Company.*

More on Problem

Here is a method used in some breweries: Insert an Ecklund thermocouple in canned or bottled beer and hook it up through a quick-action connector to a thermocouple leadwire. The temperature of the beer is recorded as it passes through the pasteurizer and cooler.

To provide the necessary flexibility for the thermocouple leadwire, suspend it on a cable, which is stretched from one end of the pasteurizer to the other. The forward motion of the canned or bottled beer then carries the leadwire through the unit. The other end of the leadwire is connected to a potentiometer—a single or multi-point instrument.—*Wm. J. Scarlett, Food Industry Manager, Brown Instrument Div., Minneapolis-Honeywell Regulator Co.*

And Still More

We have solved the instrumentation problem at several breweries in the midwest and far west. Fig. 2 and 3 show the method of securing the temperature bulb in a bottle or can and how a guide tube is arranged along the top of a pasteurizer to support the temperature-detector leadwire.

The product-temperature detector consists of a 100-ohm nickel thermohm with 110 ft. of rubber-covered leadwire joined to the brass case by a vulcanized joint. This thermohm can be used for quart or stubby bottles or for cans with bottle-cap type openings. Wire from the temperature detector is connected to a multiple point pasteurizer and product station recorder.

Usually, five thermohms are permanently mounted in stainless steel wells placed in the soaker and pasteurizer tanks. A sixth, the bottle-temperature detector, is periodically

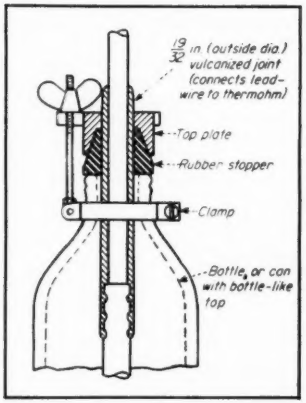
19/32 in. (outside dia.) vulcanized joint (connects lead-wire to thermohm)
Top plate
Rubber stopper
Clamp
Bottle, or can with bottle-like top

FIG. 2—DEVICE for supporting product-temperature thermohm in a beer bottle or can (with bottle type opening) traveling through pasteurizer.

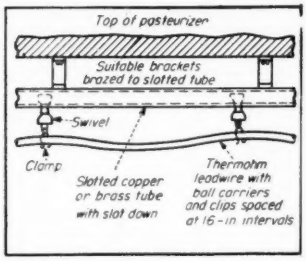
Top of pasteurizer
Suitable brackets brazed to slotted tube
Swivel
Clamp
Slotted copper or brass tube with slot down
Thermohm leadwire with ball carriers and clips spaced at 16-in. intervals

FIG. 3—OVERHEAD carrier-swivel and spring-clip for product-temperature thermohm leadwire, which is carried through pasteurizer by sample bottle or can.

inserted into one of the bottles and carried through the pasteurizer, usually three times each shift. This system gives effective spot checks on the temperature of the bottled beer as it proceeds through the pasteurizing cycle.—*R. N. Brey, Jr., Leeds & Northrup Company.*

Trouble With Pumpkin Pies

Question—Lately, we've been having a lot of difficulty with our pumpkin pies—the surface cracks and thus produces an unattractive appearance. A baker friend of ours told us that some company has extracted an edible substance from a seaplant which can be used in pumpkin-pie fillings to prevent unsightly surface cracking. Is there such an ingredient? If so, what is it? Who makes it? And how it is used?

Answer—An Irish moss extractive, SeaKem Type 3, has recently been developed by Seaplant Chemical Corp., New Bedford, Mass., which is an out-

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✓Walls
✓Woodwork
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✓Furniture

Wrap up *all* your cleaning problems in one package and hand them over to your Fuller Industrial Representative. He is a cleaning expert who brings you technical assistance on what's best for your *every* cleaning need . . . for floors, walls, woodwork, windows, furniture or equipment. And he is backed by a modern research laboratory constantly checking, testing and improving to make sure that you get the finest brushes, mops, waxes, polishes and cleaning compounds that money can buy. To ease *your* maintenance burden, call your nearest Fuller Industrial Representative, or write.

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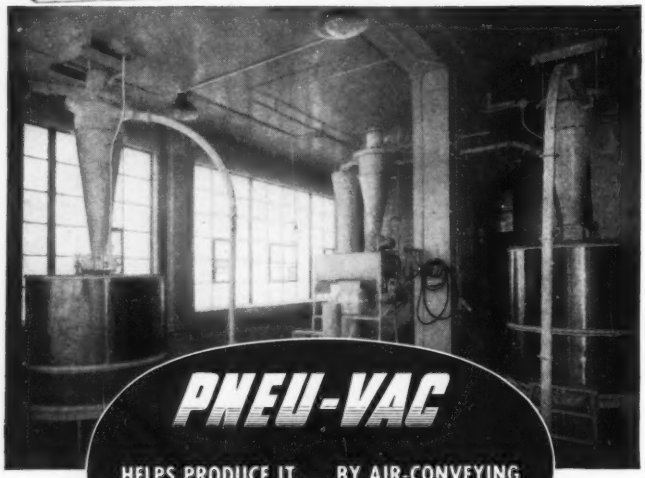
"CREAM OF RICE" HITS THE SPOT
. . . for millions of breakfasts
every morning!



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HELPS PRODUCE IT . . . BY AIR-CONVEYING
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The famous GROCERY STORE PRODUCTS CO., West Chester, Pa., has found in PNEU-VAC the best answer for handling a free-flowing, granular food product in process.

In this modern breakfast food plant PNEU-VAC is the linking key to each important phase of production – from sifting . . . to grinding . . . to mixing . . . to packaging!

For over two years, PNEU-VAC has been quietly and efficiently conveying breakfast food rice through a 3" self-cleaning pipeline. During this time, it has proved itself to be a most economical and practical conveying system for applications which demand the utmost in cleanliness and complete freedom from infestation. The three 20" PNEU-VAC pneumatic systems illustrated require minimum installation space, but adequately care for all materials handling needs.

Whatever your conveying problem may be, it will pay you to LOOK INTO Sprout-Waldron's PNEU-VAC SYSTEMS. Write for Bulletin 18-C today! Sprout-Waldron & Company, Inc., 35 Logan Street, Muncy, Pennsylvania.

SW
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SPROUT-WALDRON

PNEUMATIC CONVEYERS

standing stabilizing and "custardizing" agent for use in pie fillings.

A thermally reversible gelling agent, the new product keeps pie fillings in a completely fluid state during baking. Setting occurs only after the baked pie cools, and all shrinkage takes place before the filling is "set." As a result, unsightly surface cracking is eliminated.

Pumpkin pies containing this stabilizer can be cut into non-running, tender slices, with melt-in-the-mouth spooning qualities. The improved appearance and taste are attributed to a rigid, non-sagging gel.

We understand that less eggs are needed to make the filling because of the great affinity of the extractive for milk.

Here's a pumpkin-pie filling formula suggested by Seaplant Chemical Corp.: Strained pumpkin, 62 lb.; water, 19 lb.; sugar, 9.8 lb.; non-fat dry milk solids, 5.4 lb.; frozen eggs, 2.75 lb.; SeaKem Type 3, 0.375 lb.; salt, 0.225 lb.; and spices (to taste), about 0.45 lb.

If fresh moist pumpkin is used, texture of the filling will be soft. A dry, overcooked canned pumpkin requires additional water to compensate for lack of moisture.

Should you wish to use powdered eggs, it will be necessary to approximately double the amount of stabilizer. The exact amount, however, will depend upon the custardizing properties of the powdered eggs.

Now as to how to prepare the filling: Thoroughly mix all dry ingredients in a kettle. Add water and eggs into another mixing kettle, and then slowly introduce dry ingredients. Constantly agitate while combining to assure good dispersion. Introduce strained pumpkin into cooking kettle and heat to 160 deg. F. with agitation. Now add mixture of dry ingredients, water, and eggs to pumpkin. Heat batch slowly, under constant agitation, to 180 deg. F. Hold batch at this temperature for 5 min.

The filling is now fed into pie shells. It is then baked 10 min. at 450 deg. F., then 50 min. at 350 deg. F.

Dust, Discomfort Problem

Question—We have a problem in our candy-coating department. Dust from the battery of coating pans creates a potential explosion hazard. And employee discomfort is caused by the flow of chilled air that is directed into the pans.

Answer—Positive circulation of clean, conditioned air through the coating room will eliminate the dust hazard. But to prevent employee dis-

BOOST PRODUCTION

...with tailor-made Riegel papers

A few things RIEGEL can do for you . . .

- Keep products dry
- Keep products moist
- Retard rancidity
- Seal with heat or glue
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- Stop grease penetration
- Retain aromas, flavors
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- Boost machine efficiency

AN IMPORTANT FACTOR in production costs is the top speed at which your packaging machinery can operate . . . a factor that calls for close cooperation between packaging engineers, machinery engineers, and *paper* engineers. Over and over again, Riegel has helped boost production by providing tailor-made papers with just the right strength, sealing properties, easy formability, etc., plus closely controlled uniformity. Invariably the paper must also provide many of the protective functions listed at left. Whatever your packages may need, Riegel can develop the right papers . . . quickly, efficiently, economically. Write to *Riegel Paper Corporation, P.O. Box 170, Grand Central Station, New York 17, N. Y.*

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EVEN GREATER RESISTANCE TO VEGETABLE OILS

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*REG. U.S. Pat. Off.

WHITE NEOPRENE CONVEYOR BELTING

Ever since its introduction Baldwin Supertex has been used by so many of the leading food manufacturers because it is engineered especially for the Food Industry.

Now, Baldwin technicians have developed an improved Supertex by using the new Neoprene WRT in its manufacture.

Supertex has always shown high resistance to vegetable oils. Now it has even greater resistance making it the only belt that meets every requirement of the Food Industry.

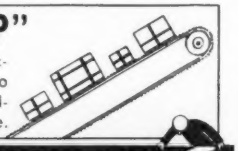
Below are six more good reasons why you should specify Supertex whenever you need conveyor belting for your food products.

1. **WASHABLE.** Easily cleaned without removing from pulleys.
2. **TASTELESS.** Food products can be carried directly on the belt.
3. **NON-TOXIC, ODORLESS.** Supertex is safe. It meets all sanitary and health requirements of the food industry.
4. **STRETCHES LESS.** Multiple plies of lightweight close woven duck give added strength with greatly reduced stretch.
5. **LEAVES NO IMPRESSION ON PRODUCT.** Perfectly smooth top cover because it is calendered and press cured.
6. **ACID-ALKALI RESISTANT.** Important in food processing, and in other industries where acid and alkali fumes are present.

Ask now for further information.

GET THE FACTS ON "TREAD TOP"

The IDEAL CONVEYOR BELT for carrying packages or articles up or down inclines of 25 to 30 degrees. Tread-top belting has a NON-SKID top that grips like the tread on a tire.



BALDWIN BELTING, INC.

483 WASHINGTON ST. NEW YORK 13, N. Y.

comfort, the velocity of air flow at any point in the room should not be very great.

Therefore, one way of solving both problems would be to introduce a gentle flow of air into the room over a wide area, and exhaust it through a series of outlets with a large aggregate intake area.

This could be done by constructing a perforated metal wall behind the battery of coating pans and placing a series of air-exhaust ducts along the opposite side of the room, in or near the ceiling.

Conditioned air would be introduced through the "porous" wall by means of low-velocity, high-volume blowers or fans and suitable distribution ducts behind the wall. This air would flow gently across the entire room, carrying dust particles with it. And low-velocity, high-volume exhaust fans connected to the outlets across the room would carry away the dusty air.

To avoid a community nuisance, it would be advisable to pass the dust-ladened exhaust air through filters or a water spray before discharging it into the open.

Color Fades In Syrup

Question—We have been attempting to artificially color a syrup containing ascorbic acid and acid calcium phosphate. Several types of red dyes were used, with the result that the color gradually faded. Would you kindly tell us how to prevent this color loss. If it is impossible to use a red color, a golden-yellow would be a suitable alternate. We might add that the pH of the syrup is 3.7.

Answer (by K. R. Leggett, Asst. Technical Director, Sterwin Chemicals, Inc.)—FD&C colors in general, and the reds and yellows in particular, readily fade in the presence of the strong reducing agent, ascorbic acid. This reaction is not always instantaneous, but it does occur quite rapidly in most cases.

If a precipitate forms, it is possible that a calcium salt of the dye is produced. Multi-valent metallic ions, such as calcium, react with dyes to form a precipitate.

At the pH indicated in your syrup, several of the FD&C reds and yellows are quite fast in color.

More on Same Problem

We assume that you do not want to omit vitamin C in your syrup formula. In this event, there is no way you can modify the syrup to prevent fading of certified colors.

Since a golden-yellow color is ac-

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for Sanitation
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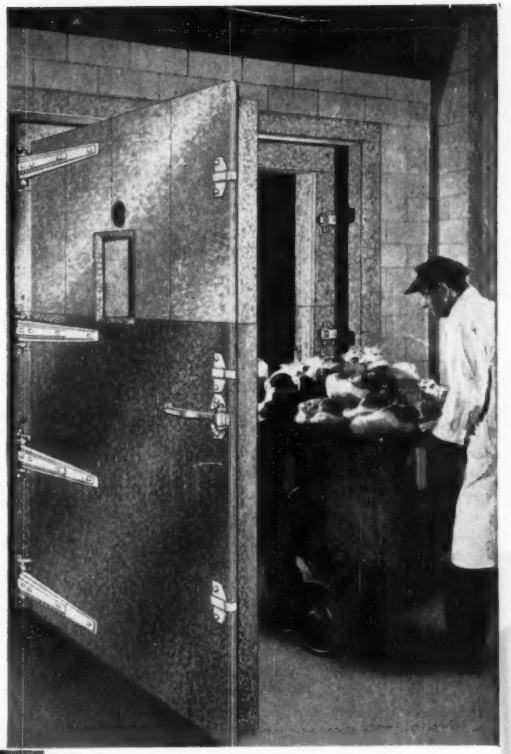
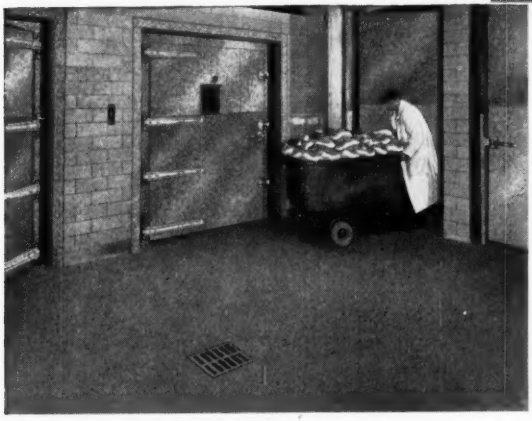
SERIES "50" DOOR
IDEAL FOR PACKING HOUSES

THE H. H. MEYER PACKING COMPANY, OF CINCINNATI, joins the long list of Packing Houses from coast to coast installing JAMISON Series "50" Doors—METAL CLAD—*for extra sanitary protection.* The continual "washing down" in Packing Houses requires sturdy, sanitary, watertight doors. These features, and the others listed on the right, insure that you get the most for your money when you get JAMISON. Jamison Cold Storage Door Co., Hagerstown, Md., U. S. A.



FULLY METAL CLAD . . . Door Matches Sanitation of Walls and Floor So All Can Be Washed Down.



STEEL KICK PLATES AND STEEL FRAMES . . . Provide Extra Strength for Protection Against Battering of Trucks and Support for Extra Width Doors.

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With This NEW Improvement Niagara "No-Frost Method" puts you a big step ahead in trouble-free, automatic refrigeration or freezing

Niagara "No-Frost Method" keeps frost and ice COMPLETELY OUT of your cooling, chilling, freezing or cold storage.

It uses Niagara No-Frost Liquid Spray to keep frost and ice from ever forming. It gives you, automatically, refrigeration with no defrosting, and full capacity NEVER cut down by ice building up progressively on refrigeration coils.

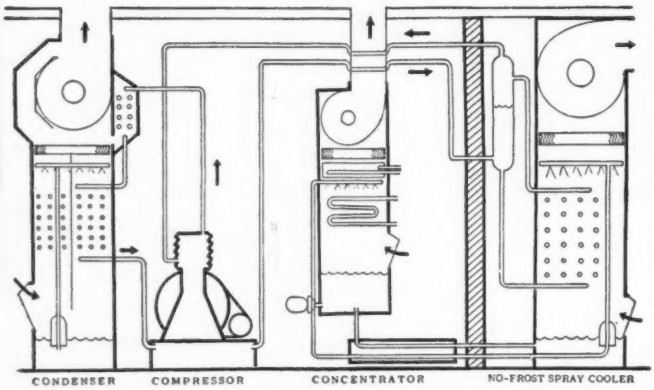
Now, a NEW design No-Frost Liquid concentrator, using a new principle, takes away moisture as fast as it is condensed by evaporating it at low temperature — not boiling it away at high temperature. It has 14 times the capacity of the old method per dollar of investment — one concentrator will handle a battery of high capacity spray coolers.

This gives you more refrigeration at lower cost; less machinery in less space. You operate at high suction pressure, saving power and wear and tear on compressors.

The extra capacity and lower cost both for equipment and operating makes this method advantageous for every type of refrigeration use — both for freezing and for moderate temperatures — for large "live" loads as in meat chilling or in fruit and vegetable pre-cooling — for rooms that are filled and emptied of product daily, such as milk rooms and terminal storage warehouses.

You get true trouble-free refrigeration . . . No brine . . . no salt solution . . . no dirt . . . no mess . . . It is entirely clean; you get rid of dirt and odors. You reduce both equipment and operating costs.

For complete information write to the Niagara Blower Company, Dept. FI 405 Lexington Avenue, New York 17, New York.



A simple method, easily maintained. Saves a third of your refrigeration cost. Ask for Niagara Bulletins 118 and 119.

ceptable, why not consider using golden invert syrup. Sugar refiners may be able to tailor-make, by blending, a syrup that will meet your requirements.

Of course, if you are preparing an artificially flavored syrup, you might consider another more expensive solution—extracting the color and flavor from the fruit with alcohol or expressing juice from the berries. Naturally, a syrup containing such juices or extractives will be of far superior quality. —*The Editors.*

Packaging Fruit Sections

Question—We have a problem pertaining to packaging orange and grapefruit sections in 5-and 10-lb. lots in polyethylene bags for the institutional trade. The product will then be frozen and distributed in this form. Since these products are not free-flowing, we are at a loss as to the best method of bag-filling these fruit sections. We might add that these sections break easily.

Answer—To package the orange and grapefruit sections into 5-and 10-lb. polyethylene bags, we suggest you consider using a volumetric-type filler. This type of machine is now being used for packaging fragile products such as macaroni (short-goods items).

The type of filler we have in mind consists of two metal disks mounted a suitable distance apart on a horizontal shaft, with radial dividers in the space between that form a number of wedge-shaped pockets. These pockets are filled with product when they are in an upright positions. Then, as the assembly rotates on the shaft, the pockets successively spill the product into bags (or any other suitable container), which are properly spaced below.

In the case of fruit sections, which might be wet with juice or syrup, it might be best to feed them over a perforated stainless steel drainage plate as they go to the volumetric filler. In this manner, consistent drained net weights could be attained.

A funnel arrangement and possibly some sort of a clamp would greatly facilitate proper placement of the bags. And the bags would then receive the fruit sections as they are dumped from each filler pocket.

Production of the 10-lb. lots would be simple. Instead of filling 5-lb. lots from each pocket, contents from two pockets can be dumped into one bag to produce a 10-lb. pack.

We believe that the labor requirements of this type of arrangement would be at a minimum. One operator could supply the fruit and bags to

Get Pfizer's
money-saving citric acid

with the water "squeezed out"!

CITRIC ACID ANHYDROUS

● Pfizer Citric Acid *Anhydrous* is your old standby Pfizer Citric Acid in a form that will save you money. You'll find this acidulant meets all the requirements of purity of the U. S. Pharmacopoeia. In fact, it differs from Citric Acid U.S.P. only in that it contains no water of crystallization. (Which accounts for 8.58% of the weight of the U.S.P. product.)

Since the anhydrous material does not "dry out," you won't be troubled with variations in acidity from one batch to another. In addition to this convenience, consider the savings you'll make on shipping and storage charges...10 drums of the anhydrous contain as much actual citric acid as 11 drums of the U.S.P. You save 8½ lbs. shipping weight for every 100 lbs. of Citric Acid U.S.P. you formerly used.

Add up these advantages of Citric Acid Anhydrous and contact Pfizer today for your requirements. It's a simple matter to revise formulas. If you wish more information, write for Bulletin F-201.

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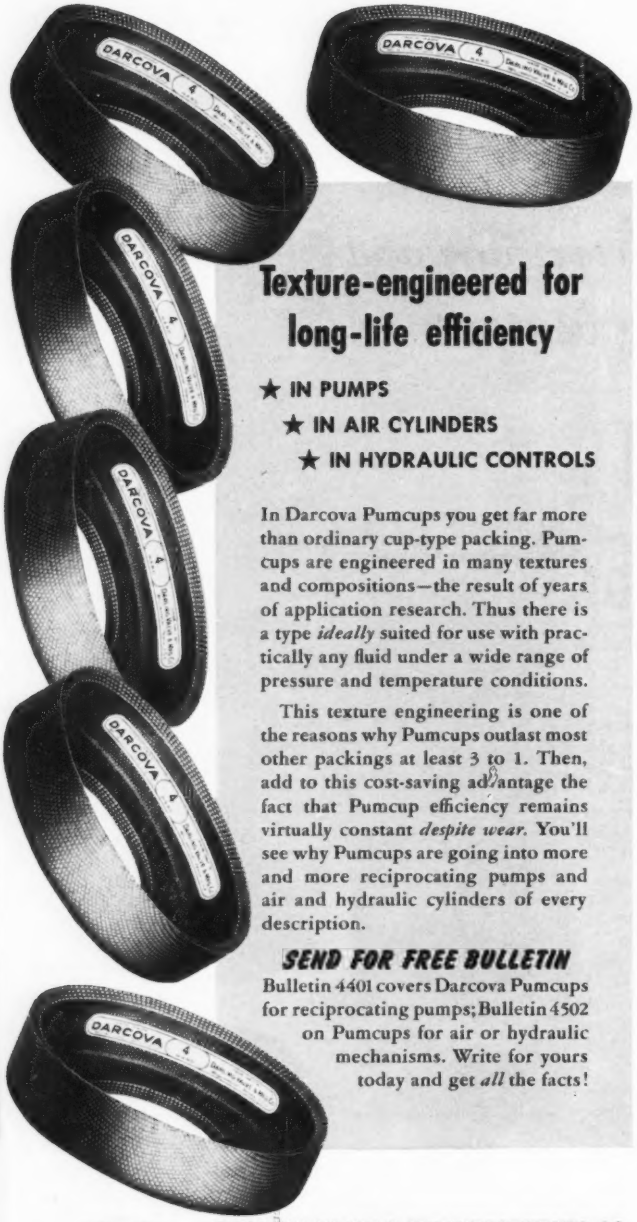
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In Darcova Pumcups you get far more than ordinary cup-type packing. Pumcups are engineered in many textures and compositions—the result of years of application research. Thus there is a type *ideally* suited for use with practically any fluid under a wide range of pressure and temperature conditions.
This texture engineering is one of the reasons why Pumcups outlast most other packings at least 3 to 1. Then, add to this cost-saving advantage the fact that Pumcup efficiency remains virtually constant *despite wear*. You'll see why Pumcups are going into more and more reciprocating pumps and air and hydraulic cylinders of every description.
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THE ORIGINAL COMPOSITION CUP
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the filling machine, operate the unit, and then remove the finished packages.

Wants to Make Papaya Drink

Question—I would like to have a formula and details for making a papaya drink, preferably a puree type beverage.

Answer—Here's a formula containing 35 percent by weight of papaya puree in a 100-lb. batch: Papaya puree (10-12 percent soluble solids), 35.0 lb.; water, 58 lb.; sugar, 6.8 lb.; and citric acid, 0.2 lb.

Preparation of the puree calls for washing ripe, carefully selected fruit, peeling, removing seeds, and pulping. The whole washed fruit is peeled with a sharp knife, and cut in half. Seeds are then removed with a spoon. Then the fruit is passed through a Langsenkamp pulper or a Chysholm-Ryder juice extractor. Each unit should be equipped with a 0.020-in. screen.

In making the drink, add sugar, puree, and about 85 percent of the water into a stainless steel tank, and then agitate. Now dissolve the citric acid in the remaining water, add to the batch, and mix thoroughly. Heat to 185 deg. F. in a steam-jacketed kettle, and fill hot (180 deg. F.) into enameled cans. Immediately cool in running water.

Needs Hot Sauce Formula

Question—We are seeking a good formula for a hot sauce to be packed in 8-oz. jars or cans. Can you furnish us with a formula with a predominant garlic and cayenne pepper flavor as well as complete details on processing methods?

Answer—Here's a hot sauce formula that we believe should meet your requirements.

First, prepare a pulp by washing, sorting, and trimming ripe tomatoes, and then run them through a finishing machine in the same manner as you would in the manufacture of tomato paste or catsup.

Now, introduce 700 gal. of the pulp into a steam-jacketed kettle and slowly add the following finely ground ingredients: Green chili peppers, 100 lb.; onions, 75 lb.; and garlic, 2½ lb.

Next, concentrate the batch to 425 gal. and add ground cayenne pepper, 2½ lb., and salt, 70 lb. Slowly boil for about 15 min. to dissolve the salt and mix the pepper throughout the batch. Immediately fill hot into jars or cans, without further processing.

You can adjust the amounts of cayenne pepper and garlic to suit your requirements.

SELECT-O-WEIGH

(ELECTRONIC WEIGHT CONTROL)

Remote, Instantaneous, Dial-Control Formula Changing and Ingredient Selection

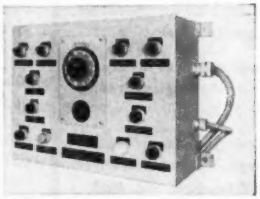
For *PROPORTIONING* Applications

Richardson E-50 Automatic Bulk Scale set up for operation with the Select-O-Weigh. Discharge from E-50 would be through hopper to next operation on floor below.

Select-O-Weigh, Richardson's electronic weight control system, reduces the most complex formula-changing and ingredient-selection problem to push-button simplicity. For with Select-O-Weigh you select, measure, and deliver up to *twelve* ingredients from a single, pre-set, remote-automatic control panel.

Through incorporation of a simple, fool-proof electronic circuit, Select-O-Weigh changes formulas *instantly*, with the setting of a dial—no sliding poise adjustments or manual weight changing. And a single, automatic scale handles many ingredients—up to twelve or more.

Select-O-Weigh is designed for either cumulative or consecutive weighing, and can be used with many existing automatic scales.



Control panel for Select-O-Weigh handling constantly varying amounts of a single material. Weight desired is set on control dial, and compensation on smaller vernier knob below it. Multiple control dials for multiple ingredients.

The Richardson Scale Company, Clifton, N. J., will be glad to supply information on:

Feeder-Weigher Systems • Automatic Bulk Weighing Hopper Scales
Automatic Bagging Scales • Bag Sewing Conveyors • Packers
Process Control Panels and Select-O-Weigh

Please write direct to our Clifton office, or to the nearest of our branch offices, located in Atlanta, Boston, Detroit, Minneapolis, Cincinnati, Wichita, Montreal, Omaha, New York, Pittsburgh, San Francisco, Toronto, Buffalo, Chicago, Philadelphia, Houston.

Write for Select-O-Weigh Bulletin #0351.

Richardson

MATERIALS HANDLING BY WEIGHT SINCE 1902

8300

New MIKRO
AIR CONVEYING SYSTEM
Ventilates and Cools as it Carries Sugar, Flour and other Foodstuffs to the MIKRO-COLLECTOR*
PULVERIZER, DRYER, MIXER, BLENDER, ETC.
MIKRO-COLLECTOR
Diagram showing installation for conveying material from dryer (or other equipment) to drum packers, cooling it during conveying from 220°F. to 120°F.

- *Permits use of ventilated air from packaging hoods to be used for conveying material*
- *Reduces required size of dust collecting unit as much as 50%*
- *Conveys material from any source (dryer, pulverizer blender, tank, vat, etc.)*
- *Cools the conveyed material without mechanical refrigeration*
- *Spans distances up to 200 feet*
- *Will by-pass any obstacle in the form of existing machinery or equipment*

These and other advantages make the MIKRO Air Conveying System an ideal low-pressure, low-cost method of conveying material from any dust source. Its complete flexibility helps solve plant layout problems without costly flow sheet revisions.

This dust-tight installation conveys up to 300 grains of dust per cubic feet of air . . . Makes possible the return of filtered air to processing area, thus reducing loss of heated or conditioned air . . . Assures freedom from infestation and metallic contamination . . . Easily cleaned . . . Eliminates booster fan, thus preventing change in particle sizing.

The MIKRO-Air Conveying System is more economical to install, operate and maintain than a conventional mechanical system. Even greater saving is effected when stainless steel or non-ferrous construction is required.

SEND FOR new MIKRO AIR CONVEYOR Bulletin

*Patents applied for by H. J. Hersey, Jr. and Pulverizing Machinery Company

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MIKRO-PULVERIZERS and MIKRO-ATOMIZERS

9015

PRESERVE OUR HERITAGE: FAITH, FREEDOM AND INCENTIVE

Graphic Panel for Control

—*Continued from page 86*

pares very favorably with other instrument boards at the refinery.

One factor on the plus side is the ruggedness of newly developed control devices for in-plant mounting. These units—called "stacked" controllers by instrument men—are a big departure from the relatively delicate mechanical linkages and associated bellows found inside instrument controller cases. Built by Moore Products, they consist of an ingenious arrangement of rugged diaphragms within a heavy compact metal cylinder and are quite simple to service and replace.

And there is another advantage of the technique. Locating the controller by the process has eliminated a sizeable controlled-air transmission lag and greatly speeded control.

Future Plans

Complete success of its initial work with graphic panels has caused Corn Products to go ahead with some remarkable plans for the complete instrumentation of its Pekin refinery. Work has already started in the construction of an air-conditioned central instrument control room which will house graphic panels for supervising the complete refining process.

End (*Resume reading on page 87*)

Vapor Separators Cut Losses

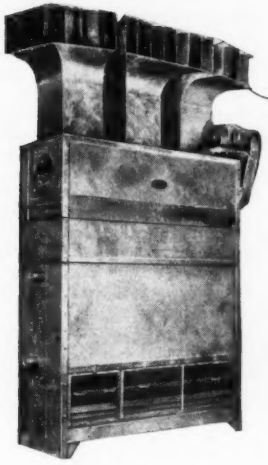
—*Continued from page 105*

able reduction in velocity would impair the efficiency of the system.

Our engineers then called in the Centrifix Corp., manufacturer of separating equipment for process vapors, steam, gas, and air. This firm was asked to develop separation equipment for three evaporators.

Design of this equipment was complicated by the fact that vapor carryover included large amounts of orange pulp and fibers which would fill up and choke off ordinary separators if left unattended.

A design was developed, for the three units, utilizing a 24-in. downflow purifier located in a 42-in.-dia. shell 50 in. high. The units were constructed to fit on the evaporator outlets and to be coupled to the 16-in. lines to the vapor condensers. The nature of the product required that the shell be constructed of Type 304 stainless clad steel. The internal parts, including the patented tuyere, were also of Type 304.



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Adjustable air diffusion outlets mean there's a Carrier Ammonia Cold Diffuser for every application . . . high velocity outlets for long range diffusion . . . low velocity outlets with adjustable vanes for wide angle dispersion and control of air flow . . . duct distribution if the application calls for it.

Get full information on how Carrier Ammonia Cold Diffusers give you dependable refrigeration for the perishables you are cooling or storing . . . how Carrier's full line of Ammonia equipment is balanced in size and performance to work together with maximum efficiency. Write Carrier Corporation, Syracuse, New York.

Carrier

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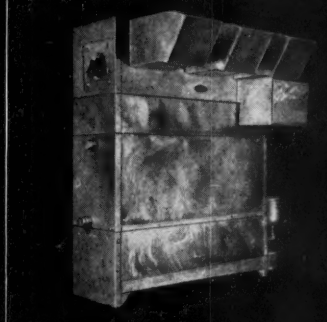
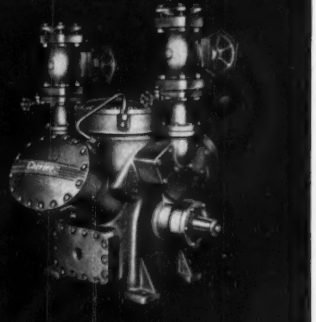
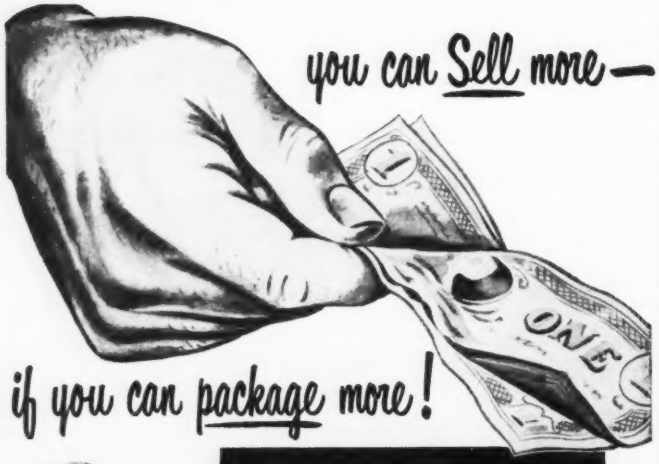
REFRIGERATION
INDUSTRIAL HEATING



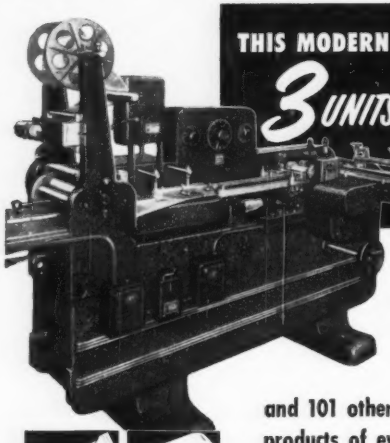
AMMONIA EVAPORATIVE CONDENSER



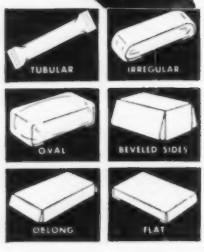
AMMONIA RECIPROCATING COMPRESSOR



THIS MODERN MACHINE WRAPS
3 UNITS PER SECOND!
(SINGLE OR MULTIPLE)



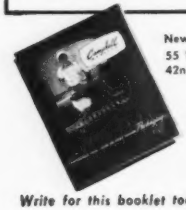
- CANDIES AND CONFECTIONS
- BAKERY PRODUCTS, FOODS
- SOAPS, TISSUE HANKIES
- PREPACKAGED MEATS
- BANDAGES, CAMERA FILM
- ICE CREAM BARS AND NOVELTIES



and 101 other miscellaneous products of every type and description

No matter how odd or irregular the shape, how fragile or solid the product — you can eliminate packaging bottlenecks and wrap it *faster, cheaper* and *better* on the automatic continuous feed, Campbell Wrapper. Normal operation wraps 150 single or multiple units per minute, with many special installations running as high as 300! Labor savings are tremendous, as in most cases only one person is needed for feeding and operating. Machine automatically positions imprinted label and seals wrap in most any style desired — including hermetical sealing. Likewise, special automatic feeds can be furnished. No other wrapping machine is so versatile — so adaptable to so many different kinds of products. Send us a sample product — we'll be glad to help solve your packaging problems.

We are contributing to the nation's defense program by providing a large part of our increased production facilities for building precision armaments.



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The problem of disposal of the trapped pulp and fibrous matter was solved by two methods: First, a 2-in. eject tube, connected to the inside of the tuyere body, was extended into the evaporator below the liquid level. By this means, the entrained product is returned to the concentrate as salvage.

Second, the evaporator purifier shell was designed with a hinged top to permit the units to be cleaned out when needed. The lid is counterbalanced, so that there is no danger of it closing when in open position. A ¾x½ in. Neoprene gasket around the lid effectively seals it when five hinged turn-down clamp bolts are tightened.

The principle of centrifugal force is employed in the evaporator separator, which also applies the basic factors of hydrodynamics. Tangentially located blades of the tuyere at the top of the shell set up a high-velocity spinning motion to the vapor entering the cylindrical tuyere body.

In addition to the direct centrifugal effect of the whirling mass, which casts the heavy entrained particles to the tuyere walls, negative and positive pressure areas within the chamber also tend to draw the entrainment toward the tuyere wall, where it drains back into the evaporator through the eject tube.

A vortex cone is located at the top of the tuyere chamber to prevent reentrainment.

Multiplied to 10

Initial installation of three vapor separators, after the evaporators, reduced previously experienced loss of the orange concentrate from the ten evaporators by 34.8 percent, according to tests made on the condensate. The success on the original units led to similar installations on the remaining seven evaporators. Subsequent tests have, as stated, shown that the ten separators have reduced the loss of concentrate by 92 percent.

Moreover, the increase in production due to the recovered concentrate is obtained without additional labor or power requirements.

Due to the design of the purifiers, separation is accomplished without moving parts or mechanical filtering devices. Consequently, no servicing has been required for the units. Again, due to the constantly washing effect of the vapor passing through the tuyere body, self-cleaning action is provided, which means that the separators are cleaned only on a preventive maintenance schedule when the rest of the system is down for cleaning and checkup.

End (Resume reading on page 106)

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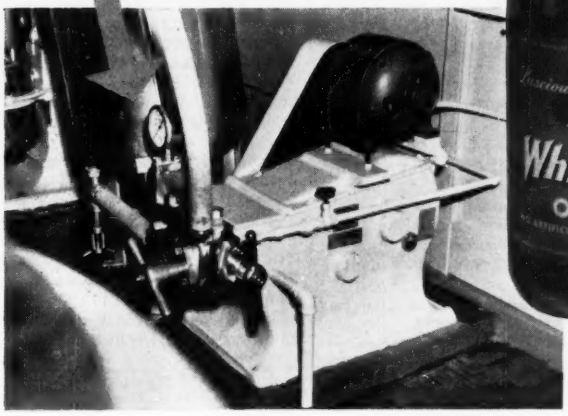
BECAUSE THEY'RE EMULSIFIED HERE



WHITE ROCK CORP. Installation in Brooklyn, N. Y. showing 75 GPH Gaulin Homogenizer used in making White Rock Orange, Tom Collins Mixer, Root Beer, Saz-Rock, and Cola.

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Gaulin Homogenizers stop separation in all kinds of beverages to help you present a uniformly attractive product to the consumer.

By breaking concentrate particles smaller, and dispersing them evenly, Gaulins eliminate sticky residues at the neck of the bottle . . . accent flavor . . . and make a perfectly uniform emulsion or dispersion.

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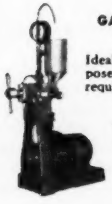

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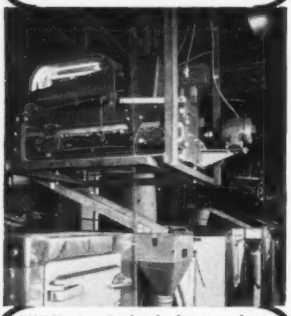

W&T Merchen Feeders feeding cocoa beans to roasters at Hershey Chocolate Corporation, Hershey, Pa.

The volumetric feeders supplying the Roasting & Separation Systems at Hershey Chocolate Corporation were not compensating for density changes in the beans.

A Merchen Scale Feeder was installed in each system giving precision feeding — by weight. The precision feed made separation more efficient, and production was increased by over 10%. Hershey had planned to add additional roasting and separation facilities but the Merchen Feeders increased the efficiency of the existing systems enough to easily carry the load.

Pleased with this performance of Merchen Scale Feeders, Hershey later installed eight more feeders on their main cocoa bean blending line.

Hundreds of food and industrial plants are enjoying similar benefits from W&T Merchen Scale Feeders. Write today for information on Merchen Feeders — and how they can benefit your plant. M-20

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FLOUR FOR MAN'S BREAD: A HISTORY OF MILLING. *By John Storck and Walter D. Teague. Published by University of Minnesota Press, University of Minnesota, Minneapolis 14, 1952. 382 pages; 7¼x10 in.; cloth. Price $7.50.*

Beginning with the history of flour milling from before the dawn of recorded time, the authors herein trace its development to its present highly advanced state. In the process, the reader is treated to the unfolding of an interesting and informative tale.

From prehistoric grinding stones identified by archeologists, one progresses through the ancient practices along the Tigris, Euphrates, and Nile and into the methods of the Greek and Roman periods. Finally, one enters the modern era of European and American history culminating in 20th-century milling practices, which are accounted in detail.

Paralleling the flour story is accent on the fact that the history of power sources and utilization, the progress of grain cultivation, the development of transportation means, and the growth of economic and industrial systems are all a part of the evolutionary process of milling.

The volume abounds in interesting illustrations and diagrams.

It was published with the cooperation of General Mills, Inc., of Minneapolis.

Re Beet-Sugar Strides

BEET-SUGAR ECONOMICS. *Edited by R. H. Cottrell. Published by Caxton Printers, Ltd., Caldwell, Idaho, 1952. 378 pages; 6½ x 9¼ in., cloth. Price $5.00.*

Extensive analysis of beet-sugar operations is now available. And noteworthy here are the author's evaluations of competitive factors posed in the marketing of beet and cane sugars.

Overall function of the book, however, is to highlight the value of beet-sugar production to the U. S. Considering that beet sugar contributes fully 25 percent of total annual domestic consumption of 8,250,000 short tons of sugar, the book is particularly significant. Political aspects, as well as economic, are given lively treatment.

Specific chapters tell how technical advancements have increased yields per acre, how mechanization has benefitted farms, how byproducts have been developed, and how new techniques have lowered operating costs in the extraction process.

The author is a vice-president of Amalgamated Sugar Co., Ogden, Utah.

Pollution Problems Solved

INDUSTRIAL WASTE TREATMENT. *By Edmund B. Besselievre. Published by McGraw-Hill Book Co., Inc., 330 W. 42nd St., N. Y. 1952. 391 pages; 6¼ x 9¼ in., cloth. Price $7.00.*

Wastes causing pollution of streams, with its concomitant nuisances, is chief concern of this well-written text.

All phases of the industrial-waste picture are discussed thoroughly. The reader gets an analysis of just what comprises waste problems—followed by the practical steps to their solution. Tasks of the engineer and specialist are covered. And methods of cooperating with local enforcement agencies are outlined.

A cross-section of chapter titles indicates the book's scope: "Sampling and Analysis of Wastes", "Combining Wastes From Several Plants to Reduce Costs", "Equipment for Waste Treatment and Its Selection", and "Reuse of Wastes and Recovery of Values".

In addition, one chapter is devoted to factors in the development of low-cost systems for waste handling.

An extensive appendix lists relative Federal and State laws, and there is a bibliography of over 6,000 references.

The author is chief sanitary engineer for International Sales, the Dorr Co., and a member of the American Society of Civil Engineers.

On Gas Controls

GAS CONTROLS MANUAL: SERVICE AND INSTRUCTION. *Published by General Controls Co., 822 S. Michigan Ave., Chicago 5, 1952. 160 pages; 8¼x5¼ in.; paper. Price $.50.*

Here is a manual that keynotes instruction and servicing while offering ready references on a wide range of gas control apparatus and applications.

Actually, this is a priced company catalog giving specific information on thermocouples, pilot burners, pilot generators, thermopilot relays, thermostats, limit controls, low pressure regulators, safety shut-off valves, water heater controls, various valves (ther-

mostatic, diaphragm, solenoid, appliance, butterfly, motor operated, and manual reset), and finally, gas heating systems.

Shaping Aluminum

ALUMINUM FORMING. *Published by Reynolds Metals Co., Louisville 1, Ky., 1952. 152 pages; 6 x 8¼ in., paper. Available free on company letterhead request.*

This technical manual tells how to draw and form aluminum sheet, plate, tubing, and pipe. Four handy indexes are included, denoting illustrations, formulas, tabular data, and general listings.

Author is E. V. Sharpnack, Sr., chief forming engineer of Reynolds Metals Co.

Government Publications

PLANNING A WHOLESALE FROZEN FOOD DISTRIBUTION PLANT. *U.S. Dept. of Agriculture, Production & Marketing Admin., Report 18. Issued 1952, 64 pages. Covers principles of improved design, layout, and location of wholesale distribution and warehousing facilities.*

REGULATIONS GOVERNING THE MEAT INSPECTION OF THE U.S. DEPT. OF AGRICULTURE. *Agricultural Research Admin., Bureau of Animal Industry. Issued 1952, 209 pages. Lists animals and animal products along with the regulations pertaining.*

These recently issued documents are available, at the prices indicated, from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. When no price is indicated, the pamphlet is free and should be ordered directly from the Bureau responsible for its issue.

DETERMINATION OF PECTIC SUBSTANCES AND PECTIC ENZYMES IN CITRUS AND TOMATO PRODUCTS. *U.S. Dept. of Agriculture, Bureau of Agricultural & Industrial Chemistry, AIC-337. Presents methods of extraction, isolation, and analysis, plus procedures for enzyme-activity measurement.*

WORLD WAR AGAINST WANT; THE WORK OF FAO 1950-51. *Available from Food & Agriculture Organization of the U.N., North American Regional Office, 1325 C St. S.W., Washington 25, D.C.* Gives highlights of FAO assistance to raise levels of nutrition and living standards in member countries by increased production of food and forestry products.

MISSISSIPPI . . . First Again!

with a New Poultry and Livestock Production Plan

Mississippi, today a leading poultry and livestock producing state, has come up with another first which promises even greater dividends for both the producer and the processor. To encourage the state's rapidly growing poultry and livestock industry, the Mississippi legislature recently adopted an act and set up a guaranty fund to encourage banks and other lending agencies to make long term livestock and poultry production loans to qualified farmers of Mississippi.

The production of poultry has increased six times in the past five years, putting Mississippi second among all the Southeastern states. The state leads all these states in cattle production, with 1,791,000 head on farms.

This thriving new industry offers unlimited opportunity to processors of poultry, livestock and dairy products. In addition, Mississippi's BAWI law—another first among states—permits communities to vote bonds to provide a site and construct a building to house processing industries.

With raw materials and a plant within your reach, you can't afford to overlook the opportunities offered under these two programs. Get the details today. Write:

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MISSISSIPPI AGRICULTURAL AND INDUSTRIAL BOARD

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Jackson, Mississippi

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It's the famous Dodge metallic-backed neoprene seal that has proved itself in thousands of installations. It stays put. It can't blow. It keeps lubricant in—dust and dirt out—even at low speeds.

The SC Ball Bearing Pillow Block for small shafts and moderate loads, is a precision-built unit—a member of the famous Dodge 30,000-hour line. Modern styling . . . rugged one-piece semi-steel housing . . . long inner race . . . radial and thrust load capacity . . . fully self-aligning. Available from distributors' stocks in shaft sizes from $\frac{3}{4}$" to $2\frac{7}{16}$". Write for special bulletin giving complete specifications.

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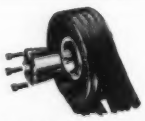

SEALED-LIFE V-BELTS AND TAPER-LOCK SHEAVES

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ROLLING GRIP AND DIAMOND D FRICTION CLUTCHES

KEEPING UP WITH THE FIELD

Technical News • Washington Highlights • Economic Trends • Labor Developments

Detects Foreign Fats

A new method for detecting foreign fats in dairy products in all possible combinations is being developed at University of Illinois, according to Dr. Fred A. Kummerow, biochemist.

It is based on the fact that lower fatty acids are distributed in approximately 80 percent of the triglycerides that make up 98 percent of all fats and oils. These triglycerides have different physical properties from the 20 percent that contain no lower fatty acids, which makes identification possible.

"Shock" Fishing Technique

Tuna fishing in Scandinavian waters has been reported speeded by an electrical method that German scientists have developed for stunning the fish.

Caught with small hooks, the tuna are then subjected to an electrical field set up in the conductive salt water between the charged hook and a second electrode on the line. The current is sent down the line from an electrical power source aboard the boat.

Temporarily unconscious, the fish are easily hauled in, the current is cut off, and the fish are then killed.

"C" in Canned Mushrooms

Use of ascorbic acid as an optional ingredient to protect color and flavor of canned or glass-packed mushrooms has now received the F&DA's Okay.

Amount of the vitamin C ingredient has been set at 37.5 mm. per oz. of drained mushrooms.

Commenting on the acceptance, the Vitamin Division of Hoffman-La Roche Inc. states that use of ascorbic acid "will allow packers to market their food at once without the previously customary 'storage time.'"

Packaging Patents Offered

More than 400 patents relating to packages and packaging—machines, methods, and composition—are now being offered by American Can Co. for non-exclusive licensing.

All are listed in the U. S. Patent Office *Official Gazette*, Vol. 662, No. 4 (9/23/52). Information on applications is available from C. R. Erne, attorney-in-charge, patent division, American Can Co., 100 Park Ave., N. Y. C. 17.

Packers Reveal Significant Trends, Problems, and New Developments

Members of the American Meat Institute traded news of trends and developments on key questions of meat packing at their recent 47th annual convention in Chicago. Highlights:

▶ **Narrow Profits**—Meat packers profits last year were the smallest of any major industry, according to H. H. Corey, president, Geo. A. Hormel & Co. And the packers must take steps to increase net income.

▶ **Supply Outlook**—J. R. Ives, department of marketing, AMI, estimated a 23¼ billion pound meat production in 1953—a 4 percent increase over this year. Beef supplies are going up next year, with further increases likely in 1954 and 1955. Because of forced marketings, supply of sheep will not increase as much this year as in 1951. Federally inspected hog slaughter this year is estimated at 57½ million head —10 percent under last year's. A further gain in poultry supplies is expected in 1953.

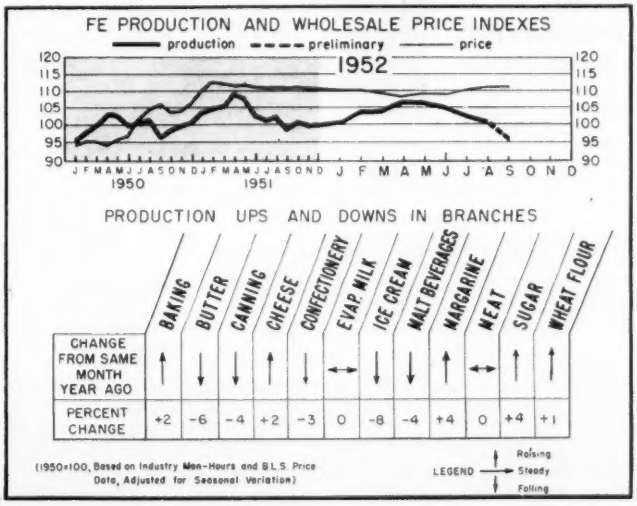
▶ **Packaging Trends** – Operators of supermarket self-service meat departments have assumed some of the functions of packers, reported F. E. Zeuch, vice-president and general manager, Century Food Markets Co. They now wrap and price meats in a backroom operation that often utilizes conveyors and packaging machines.

These operators have eyed central prepackaging to gain the advantages of mass production. They have successfully penetrated this field with the more stable cheeses and luncheon meats. Central prepackaging of fresh meats is practically impossible. However, a few operators have already found a solution—freezing. Some are already experimenting with advantages of centralized prepackaging through frozen meats.

▶ **Foam Control**—Only a few ppm. of silicone antifoam material, declared L. F. Stebelton, Dow Corning Corp., Chicago, will control foaming during rendering. Small amount of silicone is applied to the inside walls of the vessel near the top. When foam contacts silicone, it subsides—never to rise again. One application is good for five batches.

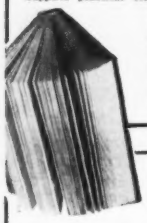
The addition of a few drops of silicone during open-pan drying of fats and oils eliminates serious foaming and overflow of fats. Also silicone-insulated electric motors run under continuous overloads of 50 to 100 percent without heat damage.

(Turn page)



HOW TO SUPERVISE PEOPLE

Gives practical help—simply and readably put—to aid you in doing a better supervision job. Covers all the typical jobs and problems of hiring, discipline, accident prevention, promoting teamwork, delegating authority, labor relations, etc. Supplies practical techniques for handling hundreds of everyday situations, with examples of specific solutions. Includes discussion of the Taft-Hartley law as it affects the supervisor, outline of a program for employee participation in management, etc. **By Alfred M. Cooper. 3rd Ed., 254 pp., $3.75**



STATISTICAL QUALITY CONTROL

Just Published—Second Edition

A practical treatment of the rapidly growing technique of statistical methods for maintaining top-notch quality on the production line. Gives cost-cutting methods you can put to work in short time with a minimum of trouble and expense. Explicit directions are given for the use of the various techniques, many case-histories illustrate control chart use, and handy tables supply valuable working data. **By Eugene L. Grant, Prof. of Econ. of Engr., Stanford Univ. 2nd Edition, 557 pp., 94 illus., 19 tables. $6.50**

INDUSTRIAL WASTE TREATMENT

Just Published!

A practical guide for plant owners, managers, and engineers. Covers the important legal aspects of stream pollution, how to secure samples and data, how to develop and test a method of treatment. Discusses factors of plant design and construction to minimize pollution, and the techniques of reclaiming byproducts. **By E. B. Besselievre, Chief Sanitary Engineer, International Sales, The Dorr Co., Engineers. 365 pp., 100 illus., 7.00**

PLANT ENGINEERING HANDBOOK

Shows you literally how to run a plant today, efficiently and economically. Answers questions on the economic, mechanical, chemical, and power operations—giving essentials of today's good practice in 76 major problem areas—an amazing compilation of data, tables, formulas, graphs, and abbreviated information for quick reference. **William Staniar, Editor-in-Chief. Prepared by more than 80 Specialists. 1955 pp., 1406 illus., 544 tables. $15.00. (Available on terms).**

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► **Fungicidal Paint**—V. J. Del Guidice, Armour and Company, stated that 10 oz. of Cunilate (solubilized copper-8-quinolinolate) in 1 gal. of paint suppresses mold growth on painted surfaces.

► **Meat Discoloration**—W. M. Urbain, Swift & Co., pointed out that the red color of fresh meats is dependent upon the presence of oxygen. To prevent darkening of packaged fresh meats, use of an oxygen-permeable wrapper was advised. However, oxygen may react in an adverse way to produce a brown discoloration. Here, instead of reacting with meat pigment to produce oxy-myoglobin — the red color—it attacks the iron in the pigment to form a brown substance, metmyoglobin. Lower temperatures will hold back such brown discoloration. Other conditions causing discoloration are salt, certain spices, extractives from wrappers, and ultraviolet light.

In the case of cured meats, oxygen is not required for color maintenance. Vacuum packaging, therefore, is a natural for cured meats. While ordinary light has little effect on fresh meats, it will soon fade the color of cured meats in the presence of oxygen. When illuminating meats, red tungsten filament lights will bring out their redness.

Profit-Making, Cost Cutting Ideas Presented at Dairy Meetings

Additional income for dairy plants can be obtained through the manufacture of a new delicacy—cultured cream spread and salad dressing. That is the opinion of Prof. W. H. E. Reid, Dairy Department, University of Missouri, expressed at the recent dairy industries convention in Chicago.

A "near ideal" product contains 15 percent butterfat, 3 percent additional solids-not-fat, and 0.1 percent cornstarch.

Cottage Cheese Threat—With less milk being produced per capita, the solids-not-fat in milk are likely to revalue upward, in the opinion of Dr. S. L. Tuckey, Assoc. Professor of Dairy Technology, University of Illinois. This will tend to increase the cost of skim milk for cottage cheese and impair that product's price advantage. Therefore it will be extremely important to (1) secure maximum cheese yields, (2) reduce curd losses during manufacturing, (3) reduce cheese losses by prolonging keeping quality, and (4) produce a high quality product.

Citrus Ice Cream—Three new tasty and attractive ice creams were presented for sampling by ice cream manufacturers. They were orange, lemon, and lime — flavored with pectinized fresh citrus juices. Comments by tasters were favorable, with the orange flavor seemingly the most popular.

Separating, Clarifying — The relatively new cold milk separator increases the quality of cream and skim milk, according to G. A. Houran, of De Laval Separator Co. And plant operating costs are lowered through saving in steam, cleanup of preheaters and coolers, and loss of cream in pipelines and cooler.

Use of the standardizing clarifier, according to Mr. Houran, has many advantages over conventional standardization of milk. It saves man-hours, more accurately controls fat content, eliminates chance for contamination in adding skim milk to whole milk, and saves considerable plant-operating time.

Trucks Use LPG Fuel—The 210 motor vehicles in Carnation Co.'s Los Angeles fleet have been converted from gasoline to LPG—liquefied petroleum gas—W. J. Thompson, Carnation's transportation manager, reported. The cost saving is 25 to 35 percent, with LPG at 7c. less per gal. than gasoline. Cost for converting a truck to LPG was placed at $204.50 —plus $16 if conversion permits the use of either LPG or gasoline. LPG leaves no carbon or lead deposits in the engine and produces very little carbon dioxide or obnoxious fumes and smoke.

Better Truck Refrigeration — Mechanically refrigerated milk trucks improve quality and reduce delivery expenses, according to N. W. Lamb, Borden Co., Houston, Tex. With 28 percent of the Houston retail fleet and 88 percent of wholesale fleet mechanically refrigerated, the saving is $10,202 a year. Mr. Lamb finds that metropolitan milk trucks can be most economically refrigerated by ammonia plates utilizing the plant ammonia system.

Products on the trucks are kept cleaner, dryer, and colder than with ice refrigeration. And there is an economically important psychological benefit to driver-salesmen.

CIP Pipelines — Cleaned-in-place pipelines were praised by both milk and ice cream plant men for their cost savings and better sanitation.

New Insect Killer

A "virtually invisible, longer-lasting" insecticidal spray — lindane blended with resin-like chlorinated polyphenyl—is announced by USDA.

Active life of the killer is stated by the Bureau of Entomology developers to be "at least twice as long as conventional lindane sprays." Further, it doesn't occasion the usual whitish powder deposits. Here, body of the blended spray film is said to act as a reservoir of the lindane, constantly renewing the insectical properties.

Fully 80 percent of all roaches were stated killed when exposed 2 hr. to a 60-day-old treated surface (50 mm./sq. ft. application). And this surface was reported to have remained lethal to 66 percent roaches after 90 days.

Hors d'Oeuvres

▶A little silicone compound wiped inside the end of a pipe will kill foam flowing from the pipe. They should put it into mouthwash for politicians.

▶Salt production last year hit a record 20 million tons. Should do even better this year, considering the amount of salt rubbed into political wounds.

▶With the easing of import restriction, plenty of foreign cheese will be available for Xmas. Fine present for our dairy industry.

▶It costs 300 times as much to haul potatoes by oxcart in Greece as in trucks in the U. S. But don't laugh. Inadequate highways here cost food processors plenty in extra trucking costs. And the Greeks have words for it: "Misuse of tax money."

▶In 1811, Napoleon honored Benjamin Delessert for obtaining crystallized beet sugar, and he ordered production in France. Nappy also fathered canned foods and oleo.—Just a food technologist at heart.

▶Communists in France backed an attack on the "imperialist" American beverage, Coca-Cola. But French chemists gave the beverage a clean bill of health. No doubt the Commies will now "discover" that Coca-Cola is a Russian invention.

▶After being frozen in Alaskan ground for 28,000 years, steaks from a super-bison was "eaten by dogs with relish." With or without relish, that's pretty good deep-freeze performance.

▶Production of frozen eviscerated rabbits in California has more than doubled since 1938. That's progress, but a little slow for rabbits.

▶More than 21 million families—about half of 'em—buy packaged wine. And the wine makers' goal is to get the other half "packaged."

"You know for awhile there the old man and I didn't hit it off too good but I'm his fair haired boy now. It all started last year when I wanted to switch our brand of conveyor belts. Our operation is pretty rough and we'd been chewin' up conveyor belts like crazy mad. I wanted to switch over to Buffalo Belts. I told him about Buffalo taking the strongest cotton yarn available and weaving it under HIGH TENSION on those special WOV-IN-WEAR looms of theirs and that this stronger yarn and tighter weaving produced conveyor belt that's tougher and LASTS LONGER. You know what? He said: 'That's a lot of malarkey!' Well, I decided to put 'em in anyway and boy, was he burned up. That was a year ago and yesterday I showed him the Buffalo Belts that had been in since then. Our operation hadn't even fazed 'em. He acted like it had been his idea in the first place and said: 'Jim, boy, I've always said "it pays to buy quality even if it does cost a little more".' Then I gave the old faker the clincher and told him that these better Buffalo Conveyor Belts didn't cost a cent more than those weak kneed belts we'd been using."

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As a space saver, it is of special interest for Armed Services' use. It may be frozen or can be kept satisfactorily in an ordinary refrigerator. In tests, it was stored at 35 deg. F. for as long as a year without spoiling.

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These formulations of piperonyl butoxide and pyrethrins can be safely incorporated into certain types of food packaging materials to prevent entrance of insects into the packages.

Dosages are exceedingly small—50 mg. of piperonyl butoxide and 5 mg. of pyrethrins per sq.ft. of surface.

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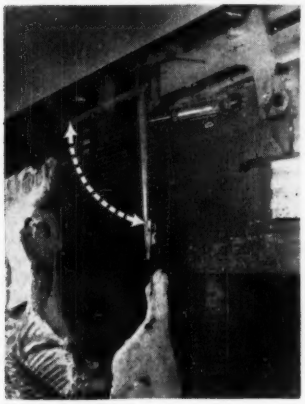

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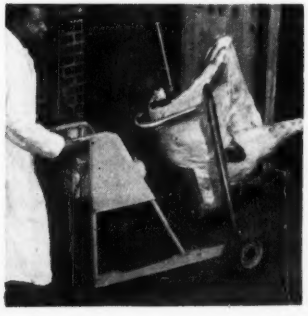

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SAVE $155 PER UNIT

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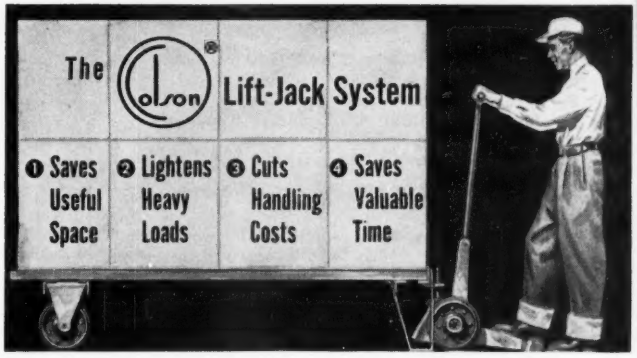

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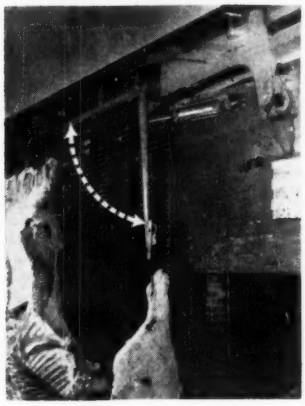

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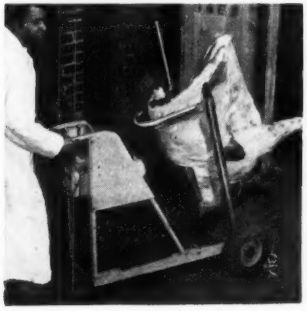

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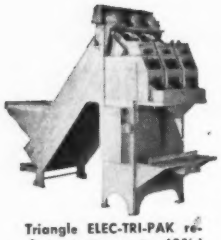
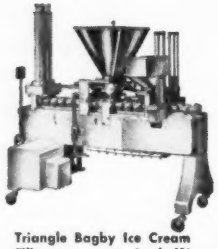
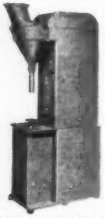


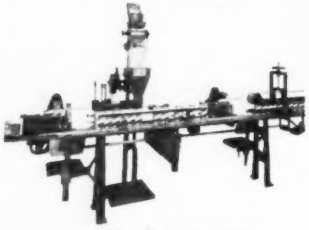
Triangle ELEC-TRI-PAK reduces costs up to 60%!



Triangle Bagby Ice Cream Filler cuts costs in half!



Triangle Auger Packer increases efficiency and profits



Triangle SA Sealer returns investment in 1 year!

HOW MUCH do you want to cut your packaging costs ?

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Dr. Samuel C. Prescott

Heads Award Committee

Dr. Samuel C. Prescott, past-president, Institute of Food Technologists, and "dean" of food technologists, has been appointed chairman of the Food Engineering Award Committee for 1953. As in '49 and '51, Dr. Prescott will supervise selection of the most meritorious process among those entered in the "achievement in food technology" competition. The food company whose process is judged the best will receive the award plaque at the 1953 annual meeting of IFT.

Other members of the 1951 Award Committee, appointed by IFT, will also serve on the 1953 Committee. They are: E. A. Beavens, W. V. Cruess, C. R. Fellers, Wm. F. Geddes, I. A. Gould, M. E. Highlands, W. A. Maclinn, E. M. Mrak, M. E. Parker, H. A. Schuette, Geo. F. Stewart, W. R. Woolrich, M. J. Copley, F. W. Fabian, A. W. Farrall, E. A. Fieger, D. B. Hand, B. L. Herrington, L. B. Howard, J. R. Matchett, J. E. Nicholas, B. E. Proctor, J. A. Shellenberger, E. H. Wiegand, and H. C. Diehl.

Fish Meal for Human Foods

Introduction of fish meal into bread in the form of a palatable white flour will go far toward combating dietary deficiences in South Africa, according to a statement by Dr. K. Bremer, Minister of Health.

Meanwhile in the U. S., Wayne Waller, By-Products Director of National Fisheries Institute, pointed out that unless some new method of producing proteins and vitamins is developed, the material now going into fish meal may well be used in human diets on several continents within 25 yr.

He states that an excellent human food product can be produced from material now used in fish meal and

solubles, without drastic changes in present processes. Such a product would probably be used as soup stock or be blended with cereals, vegetables, and condiments. It could also be used in the preparation of oven dishes or croquettes.

"200-Times" Growth Of Fla. Concentrates

Astounding growth of Florida's frozen citrus concentrate output is illustrated by new figures from the Florida Canners Assn.

Concentrate produced in the first season (1945-46) reached the equivalent of 226,000 gal. of whole juice—whereas 1951-52 saw output hitting the striking total of 44,030,633 gal., nearly 200 times greater.

And unofficial estimates foresee the current season topping the 45,000,000 gal. figure.

Here's the seven-year log of the rise (gallons): 1945-46, 226,000; '46-47, 559,000; '47-48, 1,935,000; '48-49, 10,232,000; '49-50, 21,647,447; '50-51, 30,757,656; and '51-52, 44,030,633.

A billion cans yearly are now needed for the Florida pack alone, accounting for the recent expansions by American Can Co., Continental Can Co., and Crown Can Co.

State can manufacturing now ranges to $75,000,000 yearly business, with frozen concentrates representing about $20,000,000.

New Moisture Analysis Based on Hydrogen

Strides toward an efficient, practical technique for moisture analysis of food were detailed in a special paper read at the recent Washington, D. C., meeting of the Assn. of Official Agricultural Chemists.

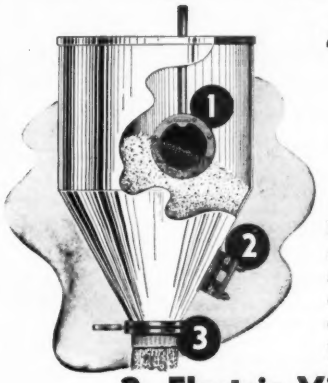
The new approach—moisture determination by hydrogen-nuclei resonance—was reported by T. M. Shaw, R. H. Elsken, and C. H. Kunsman of the Western Regional Research Laboratory, where the work is continuing.

Principle of the method relates to the quantity of hydrogen in a sample, both in the moisture content and chemical structure of the commodity itself. It is projected that differences in magnetic resonance due to varying quantities of hydrogen nuclei present will give readings which may be calibrated for given commodities.

Samples as large as 15g.—of apples, potatoes, wheat, starch, gluten, pectin, egg albumin, collagen, and wool—were analyzed in a magnetic field between two 6-in. pole pieces. The vacuum

for Complete Hopper Efficiency—

SYNTRON



1. Hopper Level Switches

Eliminate spillage and shortage of materials. Automatically maintain desired levels of materials—from fine to coarse—in bins and hoppers. Control feeding.

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Assure free-flowing bins, hoppers and chutes. Eliminate arching and plugging of materials without hammering and rodding that damages equipment and wastes manpower.

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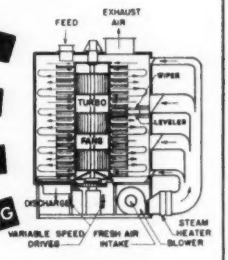

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Field erected units up to 25,000 lb. evaporation per hour.

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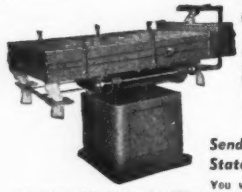
Standard equipment on feeders for Schutz-O'Neill Pulverizers.



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The finest development of Centrifugal air-force pulverizing

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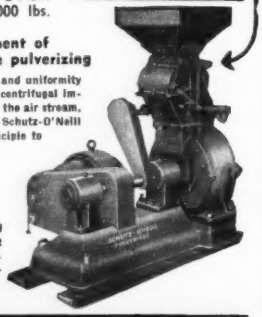
Send us stock sample State fineness desired

You will receive your pulverized stock plus our Engineering Report giving recommended equipment, methods and mill plans. Literature upon request.



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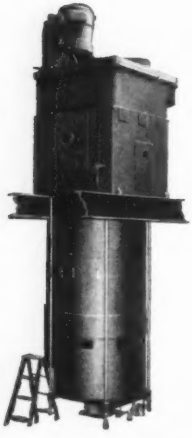

J-C's own development . . . the Floating Cone* . . . holds a constant, automatically controlled pressure against the pressed pulp as it is discharged.

Provides for single or multistage continuous countercurrent extraction for processing industries, including the following:

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RECLAIMED RUBBER: drier product (15 to 18% moisture), higher quality rubber obtained

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For application to individual problems, please write Dept. FE

* Patent applied for

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oven method of moisture analysis has been used to standardize the new technique.

Sanitation Advances Cited As Leaders are Honored

Two awards highlighted sanitation strides at the recent annual meeting of the International Assn. of Milk & Food Sanitarians.

To Paul Corash, chief of the Milk Div., Bureau of Food & Drugs, NYC Dept. of Health, went the 1952 Sanitarians Award, consisting of a special citation and the sum of $1,000 in recognition of professional achievement. And to Charles A. Abele went the Citation Award for distinguished service to the Association.

Mr. Corash was specifically honored for "leadership and influence in developing and applying sanitary standards." Named were his efforts in promoting self improvement and control by industry of milk supplies and processing methods; his early application to frozen desserts of the sanitation concept employed for milk; his use of thermoduric tests in milk evaluations, also the cryoscopic procedure; and his pioneering of standards for milk dispensers and washers for bulk milk tanks.

Mr. Abele was specially cited for his numerous committee efforts and correlations of work with that of other health organizations. Notably, he has served 10 yr. as chairman of the Committee on Sanitary Procedure, participating in development of the 3A Sanitary Standards for dairy equipment, heralded as a major contribution.

New Btu. Techniques

Electrostatic combustion boosting and heat transfer have been developed by Metal Carbides Corp., Youngstown, Ohio.

With a gas burner charged positively and the furnace bowl negatively, the flame tip is attracted to the bowl and oxygen to the flame tip. This is said to cut the gas bill 15 percent.

In the heat-transfer application, cooling-oil molecules in an electrical transformer alternately move from the hot winding to the cool case, these being the electrostatic electrodes.

Correction

In the September FE article, "New High-Speed Cooker-Cooler," captions for Charts 1 and 2, on page 149, inadvertently were transposed. Also, the word "now" in the fourth line from bottom, center column of same page, should have read "not."

Homogenized Confections

A new process—homogenizing of candy—is now stated to make possible a major improvement in taste and texture of confections. Perfected by Norris Candy Co., Atlanta, Ga., the new technique prepares "Norris-ized" candy by reducing, under pressure, the particle sizes of sugar, chocolate, flavor, and other ingredients. This results in more creaminess and uniform dispersion of flavors, according to R. Lawton Henderson, president. The method has been under test at the plant for some months, and the firm has now made application for a patent.

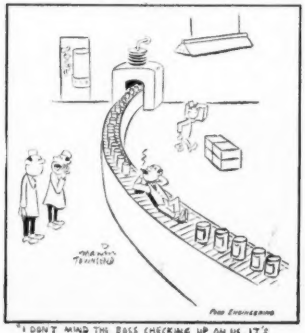
F&DA Food Standards

Ice cream standard of identity hearing recessed on Sept. 26 after about three weeks of activity. Resumption of the hearing was scheduled for Oct. 27, to continue cross-examination of witnesses on pharmacologic and other technical evidence concerning surface-active agents.

Cross-examination of witnesses who submitted new direct evidence on Sept. 26 has been scheduled for Nov. 17. Any interested party objecting to this scheduling of further testimony and examination was notified by the presiding officer to file his protest in writing or appear on Nov. 3.

Food & Drug Administration has indicated that its evidence will be introduced "on the subject of pharmacological and other technical evidence concerning surface-active agents" before this cross-examination stage is completed.

Bread standard of identity, challenged by three emulsifier manufacturers, was scheduled for hearing in the Third Circuit U. S. Court of Appeals in Philadelphia as this issue of FE went to press. Action in the Eighth Circuit Court has been deferred until "30 days after" the Third Circuit Court decision.



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Whether it's canning, freezing, dehydrating, or any other food processing operation, this rugged La Porte Flexible Steel Conveyor Belting will serve you better with lower maintenance cost.

STEEL MESH CONSTRUCTION protects against loading impacts. FLEXIBILITY FEATURE allows belting to gain a tighter grip on the friction drum . . . puts an end to creeping, weaving, jumping—thus, it assures a perfectly flat surface for containers, empty or filled. OPEN MESH provides circulation or air and liquids around products in process and makes cleaning faster and easier. Highly resistant to heat, cold and steam. Find out how La Porte can increase *your* food processing efficiency.

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Schedule of Events

November

10–12—Grocery Manufacturers of America; New York City.
11–13—Southern Assn. of Ice Cream Manufacturers, annual convention; Jung Hotel, New Orleans, La.
16–21—Master Brewers Assn. of America; annual convention; Jung Hotel New Orleans, La.
17–20—American Bottlers of Carbonated Beverages, annual meeting, and International Beverage Exposition; Auditorium, Atlantic City, N. J.
19–21—Dairy Manufacturers' Short Course; Texas Technological College, Lubbock, Tex.

December

1– 6—National Exposition of Power & Mechanical Engineers; Grand Central Palace, New York City.
4– 5—Tri-State Packers Assn., annual convention; Atlantic City, N. J.
8–11—National Coffee Assn., Boca Raton, Fla.

January, 1953

5–31—Fundamentals of Dairy Manufacture Short Course; University of Minnesota, Minneapolis.
10–14—United States Brewers Foundation, 77th annual convention; Waldorf-Astoria Hotel, N. Y. C.
12–24—Ice Cream Plant Men's Short Course; The Pennsylvania State College, State College, Pa.
19–22—Plant Maintenance Show & Conference; Public Auditorium, Cleveland.
23—Pennsylvania State Ice Cream Conference; The Pennsylvania State College, State College, Pa.
29—Barley Improvement Conference, Midwest Barley Improvement Assn. and Malt Research Institute; Hotel Nicollet, Minneapolis.

USDA Grade Standards

Recent actions by Production & Marketing Administration of U. S. Department of Agriculture on U. S. Grade Standards and related activities include the following:

Edible sugarcane molasses, corrections in standard, published p. 6181, July 10 *Federal Register:* (1) P. 6181, second column, Sec. 44.3, paragraph (b), line 14, and p. 6183, third column, line 5 should read that total sulfites are "not more than 250 parts," instead of 200 parts; and (2) P. 6184, first column, line 5, should read "cobalt chloride," instead of copper chloride. These corrections appeared on p. 8377 and 8570 of Sept. 18 and 26 *Federal Registers*.

Florida tangerines, new, p. 8377 Sept. 18 *Federal Register*, effective Oct. 18.

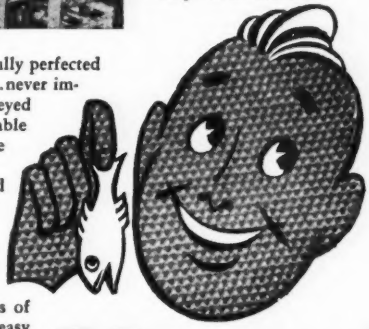
Shelled pecans, revised, p. 8413 Sept. 19 *Federal Register*, effective Oct. 19.

Dried currants, revised, p. 8415 Sept. 19 *Federal Register*, effective Oct. 19.

Frozen diced carrots, revised, proposed, p. 8439 Sept. 19 *Federal*

SUPRENE BELTING

Helps Food Stay Wholesome



Suprene Belting has been carefully perfected to help foods stay wholesome... never imparts any taste or odor to conveyed products. Made of tough, durable duck and impregnated with the exclusive Victor "Neoprene" compound, Suprene has proved of inestimable value in the packing, processing and manufacture of food products.

Suprene Belting is not only waterproof, but is also highly resistant to the injurious effects of fats, greases and fruit acids. It is easy to wash with steam or hot water. Specify Suprene Belting for all your conveying needs and be sure of safe, sanitary conveyance for years. Send for bulletin 20—it's free.

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Mountains of Chocolate

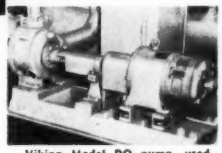
Produced by Hershey Chocolate Corp. with the Help of Viking Rotary Pumps

Operating the most complete chocolate plant in the world, the Hershey Chocolate Corporation depends upon Viking Pumps for rugged service, pumping liquids and semi-solids in many steps of their chocolate products production.

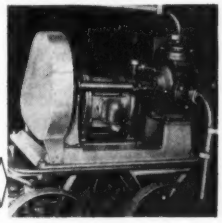
One Viking Pump has circulated chocolate liquor at Hershey's for 16 years, 16 hours a day, 5 days a week, all year around, with only one major overhaul. It is a typical Viking pumping performance.

The Viking line is complete, with models designed to meet most pumping problems. For information, write for bulletin 52SE.

A Viking Model LQ-124 used as a cocoa butter transfer pump.



Viking Model DQ pump, used on chocolate liquor return line, in use since 1936.



A Viking Model ZQ unit used in unloading chocolate milk paste from "conches." Note unit is mounted on a truck.

VIKING PUMP COMPANY
CEDAR FALLS, IOWA
THE ORIGINAL "GEAR-WITHIN-A-GEAR" ROTARY PUMP

STILL THE ALL-AMERICAN FIRST

Master Gearmotors have given more millions of hours of satisfactory service in the field than all other makes . . . COMBINED.

THE MASTER ELECTRIC COMPANY · DAYTON 1, OHIO

Register, written comments received until Oct. 19.

Shelled almonds, revised, p. 8648 Sept. 30 *Federal Register*, effective Oct. 30.

Canned grapefruit, third revision, proposed, p. 8920 Oct. 4 *Federal Register*, written comments received until Oct. 19.

—*End*—

Multi-Plant Efficiency

—*Continued from page 109*

hand know what the left hand is doing.

The decentralization of multi-unit operations carries with it the need for a certain amount of inter-office correspondence, telegrams, and telephoning. There is just no getting away from it entirely; it is inherent in the setup. Many engineers detest "paper work", and it is never amiss to stress the importance of careful accuracy, not only in passing along engineering information, but in requesting it from another office. Many days have been wasted because of a poorly worded request, or an ambiguous reply.

Time-Savers Noted

A little thought and ingenuity will lead to many "short cuts" to minimize time consumed in communication without sacrificing precision. One example is use of a duplicate form, when a unit makes an appropriation request. One copy can simply be returned to its originator stamped "Approved" (or not, as the case may be) with resulting elimination of two letters.

Another is use of a form for reporting surplus equipment. With any confidential information detached, this can be circulated outside the company to facilitate sale of unwanted assets. Liberal use of check lists, form letters, private codes, and other similar means, will save valuable engineering time, and numerous applications will readily suggest themselves.

In this connection, do not forget the ancient adage that "one picture is worth a thousand words". Seldom is this truer than in dealing with engineering questions at a distance.

Of inestimable value are personal trips and exchange visits. Everyone prefers to deal with someone he knows as an individual rather than as a signature only, and many cases of poor cooperation between headquarters and a unit have been ironed out by a well-timed visit. Each participant is apt to gain new insight into the company's problems and new respect for

Better production for
world's largest corn packer
● In this progressive Midwestern plant, fresh corn from the husking machine is carried on a Cyclone Chain Drive Spiral Woven Conveyor Belt through continuous, automatic washing, sorting, processing and inspecting operations. Packer reports results are: reduced labor costs—less manual labor—better product quality.
Cyclone Metal Conveyor Belts are adaptable to a great variety of food—and other manufacturing plant—operating conditions, whether large or small. Our engineers will advise you on which of the three belt types—Spiral Woven, Flat Wire and Flex-Grid—is right for your processing bottleneck. Send to Dept. H-112 for a free copy of Catalog #4.
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Low-Temperature
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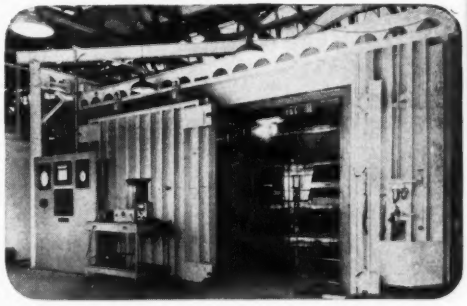

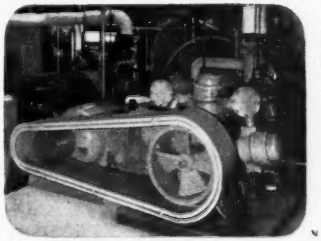

Frick 9-Cylinder "ECLIPSE" Compressors Handling Low Temperatures for RCA Victor

Temperatures down to 85 degrees below zero are maintained by a 3-stage Frick system in this altitude-temperature-humidity chamber of the Radio Corp. of America at Camden, N. J.—where two other test rooms are also cooled to minus 100 F. by Frick refrigeration. All built by Tenney Engineering, Inc., with offices at Newark and Baltimore.

For that all-important job of YOURS, whether air conditioning, ice making, quick freezing or other cooling work, specify Frick refrigeration.

DEPENDABLE REFRIGERATION SINCE 1883
FRICK CO.
WAYNESBORO, PENNA. U.S.A.
Also Builders of Power Farming and Sawmill Machinery

Reduce Mixing Time... Improve Product Quality...

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HIGH SPEED

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Write for latest descriptive Bulletin.
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Have You Considered SPRAY DRYING Your Product?

Frequently this cuts 5 and 6 operating steps from your process.

The resultant savings will enable you to write off the cost of the Zizinia Spray Dryer (Engineered by Snell) in very short order.

ZIZINIA
SPRAY DRYER

Here is the Dryer of lowest cost, easiest installation. Operating simplicity, stainless steel construction, of course. Bulletin on request.

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Cut out OVERLOADING UNDERLOADING

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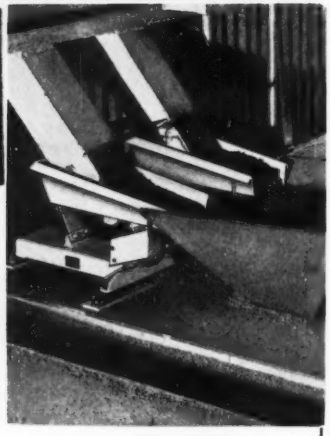
SYNTRON VIBRATORY FEEDERS



Syntron Vibratory Feeders provide an efficient, economical method of conveying bulk foods and the simplest and easiest means of controlling the rate of flow.

All along your food production line materials can be made to flow as desired—your processing plant need never be starved or overfed—with Syntron Feeders your feed rate can be varied to provide a flow of bulk foods to suit your needs.

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460 Lexington Avenue — Homer City, Penna.

DOUBLE BARREL ADVERTISING

Advertising men agree—to do a complete advertising job you need the double effect of both Display Advertising and Direct Mail.

Display Advertising keeps your name before the public and builds prestige.

Direct Mail supplements your Display Advertising. It pin-points your message right to the executive you want to reach —the person who buys or influences the purchases.

In view of present day difficulties in maintaining your own mailing lists, our efficient personalized service is particularly important in securing the comprehensive market coverage you need and want.

Ask for more detailed information today. You'll be surprised at the low overall cost and the tested effectiveness of thse hand-picked selections.

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his co-workers through such personal contact.

In fact, one company found it advantageous to hold a series of headquarters conferences for all unit engineers. With well-planned agenda prepared from current questions submitted ahead of time by the participants and circulated in advance, these meetings yielded gratifying results in improved understanding and cooperation. Needless to say, the schedule of these meetings was not limited one hundred percent to business sessions, and warm friendships have grown naturally from them.

End (Resume reading on page 110)

1-Minute O_2 Test

—Continued from page 75

analyzer, range 0.5 percent 0_2, is used for this purpose. Readings which are accurate to 0.05 percent 0_2 are obtained in approximately one minute.

Sampling is simple. First, the mercury level in the gas reservoir is lowered (see illustrations above). Next, the can is placed on a platform which is raised to engage the rubber seal surrounding the piercing needle. The entire system is then evacuated and checked for leaks.

The can is pierced, allowing the gas to distribute itself between sample reservoir and can. (A hydraulic jack is used to raise the can for piercing). The sample is then passed into the analyzer and the oxygen content measured. Readings are obtained directly from the position of a light beam on a graduated scale. Measurement is made directly on the sample as it enters the instrument. It is unaffected by secondary changes in other properties such as thermal conductivity and viscosity. Determinations are equally accurate on wet or dry gases regardless of temperature.

Other Applications

Film packages are easily tested, also. A small rubber patch is cemented to the film (see drawing). The hypodermic needle is inserted into the patch, but not far enough to pierce the package. The system is then evacuated as above, the package is slowly pierced, the sample is drawn into the analyzer and the oxygen content observed.

The Model C is quite versatile and adaptable to any type of can or film package sampling technique. Not only may fixed-volume samples be measured, but continually flowing gases may also be analyzed.

End (Resume reading on page 76)

WATEROUS 100% SANITARY PUMPS

Flow settings on a WATEROUS Sanitary Pump stay constant. Internal clearances are fixed . . . there is no metal to metal contact between rotors and housing. There is no aeration . . . no squeezing of the product. From the moment the pump is started to the moment it is stopped, output volume remains constant. This positive control of volume is of vital importance in product transfer and accurate blending and mixing operations.

Easy to take down and easy to clean, WATEROUS Sanitary Pumps meet all 3A standards for sanitation. Thin, viscous or semi-solid materials are handled with equal ease.

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Waterous DEPENDABLE PUMPS SINCE 1886

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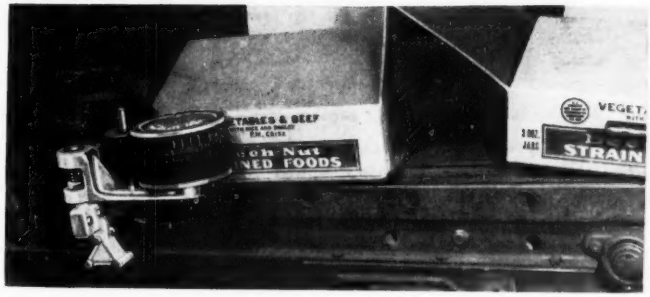
Eliminate Hand Labor for Marking Cases



Gottscho ROLACODER Imprints Varieties, Brands, Code-Dates, Flavors, Lot Numbers *automatically*

Use the Gottscho ROLACODER to mark your cases and save the cost of rubber-stamping or stencilling labor. Get neater, cleaner, more accurate marking, too. The ROLACODER attaches easily to packaging or sealing machine, conveyor, etc.—marks packages automatically as they move along the line. Friction-operated, self-inking, engineered for long and efficient service. Copy changes made in minutes. Models to imprint top, sides and ends of every kind of package.

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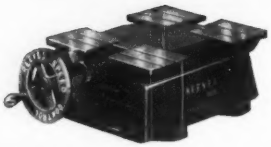
ADOLPH GOTTSCHO, INC., Hillside 5, N. J.

Machines to MARK whatever you MAKE

Gottscho

Reeves Vari-Speed Motor Pulley

converts any standard constant speed motor to a low-cost stepless variable speed drive . . .

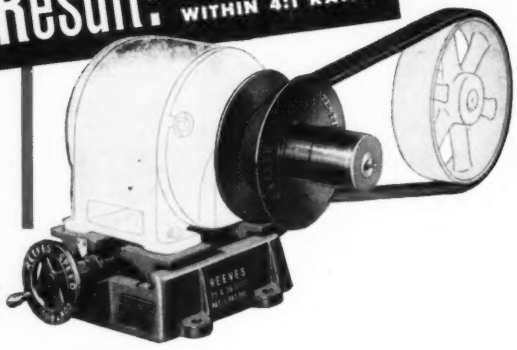


1. REEVES Motor Base provides sliding platform for motor. Handwheel or push-button control increases transmitted speed by moving motor toward driven machine, decreases speed by reversing the operation.

2. Disc Assembly connects directly to motor shaft. Assembly consists of two facing cone-shaped discs—one sliding laterally—and compression spring for mounting as a single unit on motor extension shaft.

3. Special V-Belt hooks up unit with driven machine. Belt fits between discs and over pulley on power input shaft of driven machine. Belt is adjusted to minimum center.

Result: INFINITELY VARIABLE SPEED WITHIN 4:1 RATIO



Unit instantly delivers any desired speed over entire range and maintains that speed without fluctuating even a fraction of an rpm.

The REEVES Vari-Speed Motor Pulley is the easiest, lowest-cost method of converting a machine with fixed speeds into a highly versatile unit of infinitely variable speed adjustability. Thus equipped, it can handle a wider range of work, better, faster and more economically, because machine speed can be changed instantly and accurately—without shutdowns—to meet the needs of every operation and every operator, *under every changing condition.*

This REEVES unit forms the actual driving element between motor and driven shaft . . . eliminates all auxiliary equipment such as chain drives, gears, belts, etc. . . . requires virtually no more space for installation than any standard belt or chain drive. It is built in eleven sizes, transmitting from ⅛ to 10 hp., over speed ratios from 2¼:1 to 4:1, inclusive.

The complete line of REEVES Speed Control equipment also includes two other basic units, the Variable Speed Transmission and the Vari-Speed Motodrive, which are offered in the widest selection of designs, sizes, capacities and speed ratios—handwheel, push-button or entirely automatic controls.

REEVES units have proved their ability to speed production, cut cost and increase profit in more than 300,000 widely diversified industrial applications . . . are listed as standard equipment on over 2,100 different makes of modern machines.

An experienced REEVES Speed Control specialist will be glad to work with you in selecting the units best suited to your needs. Write today, arranging an interview, and ask for Catalog FE7b-G.

REEVES PULLEY COMPANY • COLUMBUS, INDIANA

Recognized Leader in the Specialized Field of Speed Control Engineering

ACCURATE • VARIABLE

Reeves Speed Control

GIVES THE RIGHT SPEED FOR EVERY JOB!

Recent Inventions

PRODUCTS

Food Composition for Infant Nutrition Comprising Electrodialyzed Whey, Together With Added Fat and Casein—*S. G. Weichers, The Hague, Netherlands, to de Nederlandsche Centrale Organisatie Voor Toegepast-Natuurwetenschappelijk Onderzook, The Hague. No. 2,604,403. July 22, 1952.*

Non-Milkfat Stable Cheese Made From Skim Milk Curd, by Stacking, Cutting, Pressing, Aging, Shredding, Heating, Agitating and Adding Edible Oil—*H. J. Peterson, Tenica, Ill. No. 2,604,405. July 22, 1952.*

Stabilizer for Ice Cream Made of Edible Non-Toxic Water-Soluble Cellulose Ether and Water-Soluble Gum of Irish Moss—*N. Bilhovde, El Monte, Calif. to The Borden Co., New York. No. 2,604,406. July 22, 1952.*

PACKAGING

Beverage Bottle Carrier Employing Wire Element Bottle Supporting Frame—*F. T. Mayers and D. I. D. Mayers, Ruthland, Va. No. 2,603,377. July 15, 1952.*

Filling Machine Control Detects Container Absence and Blocks Filler Action—*P. E. Fischer and M. B. Sturdevant. to General Mills Inc., Minneapolis. No. 2,603,398. July 15, 1952.*

Rotary Filling Machine for Bottling Carbonated Water Under Pressure—*J. B. Vance, Birmingham, Ala. to Crown Cork & Seal Co., Inc., Baltimore. No. 2,603,399. July 15, 1952.*

Machine for Wrapping Bundles of Banded Spaghetti—*M. Klimas, Richmond Hill, N. Y. to A. Zerega's Sons, Inc., New York. No. 2,604,744. July 29, 1952.*

PROCESSES

Shelling Nuts by Passage Between Plates in Electrostatic Field to Vaporize Internal Liquid and Cause Shell Bursting Pressure—*O. Thaning, Eikenhof, Transvaal, Union of South Africa. No. 2,601,421. June 24, 1952.*

Extracting Aromatic Oils From Divided Vanilla Beans by Vibrations in a Supersonic Wave Transmitting Liquid, With Final Separation of Diffused Oil From Liquid—*L. Romagnan to A. Romagnan, Nice, France. No. 2,601,635. June 24, 1952.*

Improving Flavor of Canned Fish by Adding Citrus Oil Containing Honey and Vegetable Gum Before Sealing—*H. D. Dakis, San Diego, Calif. No. 2,602,030. July 1, 1952.*

Preserving Raw Popcorn by Placing in Mold and Pouring Liquified Solid Vegetable Fat to Fill Interstices—*G. Martin. to Popcorn Products Corp., Milwaukee, Wis. No. 2,604,407. July 22, 1952.*

Unpeeled Whole Fresh Vegetables Protected Against Fungoid Decay by Applying Aqueous Solution of Thioacetamide—*C. D. Cothran, to Progdex Co., Pomona, Calif. No. 2,602,409. July 22, 1952.*

Developing Chocolate Flavor by Feeding Ground Sugar-Containing Mass Through Heated Rolls Set Apart a Slightly Greater Distance Than the Sugar Grains—*H. K. Weiner, Wallington, England. No. 2,602,743. July 8, 1952.*

Concentrating Milk by Passing Through Freezing Treatment Stages, Circulating Ice Crystals Removed From Concentrate to Each Preceding Stage, Centrifuging to Remove Ice Crystals in Last Stage—*G. L. Cunningham, Cincinnati, to the Commonwealth Engineering Co., Dayton, Ohio. No. 2,602,745. July 8, 1952.*

Extracting Juice From Cellular Articles by Freezing, Partially Thawing, Macerating, Blending to a Flowing Liquid, Pressing to Separate Juices, Freezing, Centrifuging, Refluxing Separated Juice Into Juices Being Frozen—*G. L. Cunningham, Cincinnati, to Commonwealth Engineering Co., Dayton, Ohio. No. 2,602,750. July 8, 1952.*

Sterilizing Foods With High-Energy Electron Radiations by Rapid Scanning With Electron Beam to Increase Instantaneous Ionization Density and Thus Reduce Adverse Effects—*D. M. Robinson, Arlington, Mass. to High Voltage Engineering Corp., Cambridge, Mass. No. 2,602,751. July 8, 1952.*

Extracting Beet Sugar in a Vertical Tower by Screw Conveyor Movement of Beets Countercurrent to Extracting Fluid—*E. Langen, Elsdorf, Germany to Superior Sugar Extraction Inc., New York. No. 2,602,762. July 8, 1952.*

EQUIPMENT

Mechanism for Reversing Direction of Travel of Sheeted Dough Pieces—*M. A. Stickelber, Kansas City, Mo. to Stickelber & Sons, Inc., St. Louis. No. 2,600,281. June 10, 1952.*

Fish Skinning Machine Employing Roller and Tangentially Cutting Knife With Gripping Members Moving Tail End First—

Meat Packing Plant * eliminates grinding room shut-downs with one

Limited space at this particular plant added to the problem of eliminating clogging of the meat scrap grinder. A 48-inch, single deck SWECO Separator with a ⅛-inch mesh screen was installed in a minimum space. It immediately took the bulk of the load off the grinder by removing fines after the crushing operation preventing them from reaching and clogging the grinder. Unit handles up to 10 tons per hour with complete efficiency. Both Standard and Custom-Engineered models available.

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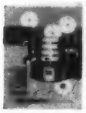

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Cake Icings	Frozen Fruit Juices	Ripple Ice Cream Syrups
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- ☐ Physical & anti-oxidant protection
- ☐ Thermally-reversible gels

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SEAPLANT CHEMICAL CORPORATION
63 David St., New Bedford, Massachusetts

G. E. Hube to Pacific Laboratories, Inc., Bellingham, Wash. No. 2,601,292. June 24, 1952.

Vegetable and Fruit Washing Machine Employing Inclined Oscillating Pan Which has Greater Movement at Intake End—A. B. McLauchlan, Salem, Ore. No. 2,601,411. June 24, 1952.

Apparatus for Splitting Almonds Utilizing Two Vertical Belts to Move Nuts to Cutting Knife in Fixed Parallel Position—D. R. Bailey, Sacramento, Calif. No. 2,601,490. June 24, 1952.

Apparatus for Blast Cleaning Cans on Both Inner and Outer Surfaces Utilizing a Rotating Housing and Directed Streams of Grits Mixture—T. F. Clark, Peoria, Ill. to U.S.A. No. 2,601,746. July 1, 1952.

Corn Cleaner and Separator Comprising Screw Conveyor Feeding Plurality of Concentric Frusto-Conical Screen-Bearing Drums—T. W. Gonder, Viola, Tenn. No. 2,601,924. July 1, 1952.

Fish Cleaning Machine Employing Knife to Partially Sever Heads of Conveyor-Borne Fish, and Spring Means for Removing Head and Entrails—J. S. M. Harrison, and S. W. Roach, North Vancouver, B. C., to Canadian Patents & Development, Ltd., Ottawa, Canada. No. 2,602,184 July 8, 1952.

Poultry Singeing Machine Employing Photoelectric Control Circuit Which Synchronizes Jetting of Flame with Bird Movement—G. W. Johnson, Raytown, Mo. to Gordon Johnson Co., Kansas City, Mo. No. 2,602,185. July 8, 1952.

Poultry Scalding Unit With Moving Screen Belt That Separates Waste Material from Scalding Water—G. W. Johnson, to Gordon Johnson Co., Kansas City, Mo. No. 2,602,186. July 8, 1952.

Onion Peeling and Slicing Machine Employing Rotating Impaling Spindles and Cutter Elements—D. L. Taylor, Dixon, Calif. to Machinery Development Corp., Caldwell, Idaho. No. 2,602,480. July 8, 1952.

Honey Bottling Unit Containing Inner Tank With Straining Sack, Level and Temperature Indicator, Discharge Orifice—H. L. Eckdahl, Robbinsdale, Minn. No. 2,602,546. July 8, 1952.

Pie-Making Machine Employing Multi-Filling Station Circular Conveyor Electrically Synchronized to Discharge Vertical Nested Stack of Pie Plates—E. L. Sheehan, Chicago. No. 2,602,566. July 8, 1952.

Egg Cleaning and Sanitizing Apparatus With Conveyor Passing Through Two Oppositely Rotating Abrading Shafts—W. L. Slocum and H. L. Haggard, Miami, Fla. No. 2,603,039. July 15, 1952.

Bimetallic Thermometer for Integral Mounting in Beveled Sanitary Pipe Fitting—A. H. Lamb, Hillside, N. J. to Weston Electrical Instrument Corp., Newark, N. J. No. 2,603,091. July 15, 1952.

Continuous Pastry Shell Deep-Fat-Frying Machine With Means for Reversing Dough Blanks in Tank, Folding Blanks in Shell, Conveying Shells Through Tank—G. E. Saenz, Mercedes, Texas. No. 2,603,143. July 15, 1952.

Fowl Picking Machine Employing Plurality of Drums Flanking Conveyor Which Carries Inverted, Suspended Birds—A. Sharp, to Barker Poultry Equipment Co., Ottumwa, Ia. No. 2,603,831. July 22, 1952.

Cheese Press With Bottom-Controlled Means for Applying Pressure at Top of Series of Vertical Columns of Forms—R. Miollis, Shelbina, Mo. to The Borden Co., New York. No. 2,604,036. July 22, 1952.

Apparatus for Preparing Laminated Stick Chewing Gum by Pressure Extruding Upper and Lower Gum Strips and Candy Center—L. W. Mahle, Abington, Pa. to Frank H. Fleer Corp., Philadelphia, Pa. No. 2,604,056. July 22, 1952.

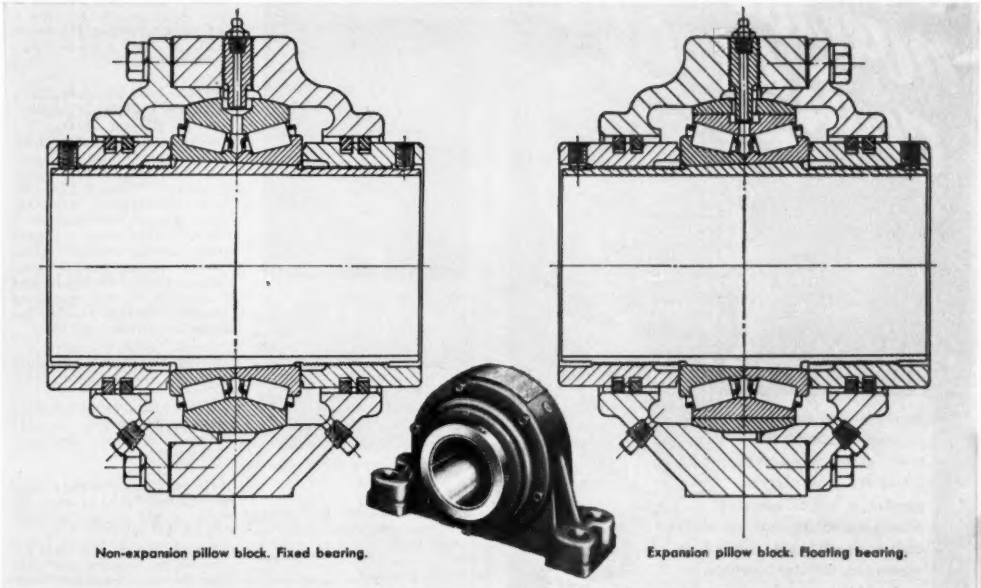
Bakers Oven With Chamber Having Top and Bottom Radiator Conduits, Each Connecting a Pressure and Suction Box, and Means for Circulating Combustion Products—J. I. D. Warrington, Peterborough, England to Baker Perkins, Inc., Saginaw, Mich. No. 2,604,059. July 22, 1952.

Apparatus for Separating Mud, Weeds and Stems From Vegetables Employing a Continuous Path Through Oppositely Rotating Rolls, Alternates of Which are Equipped With Helical Flight—A. A. Armer, Davis, to Spreckles Sugar Co., San Francisco, Calif. No. 2,604,206. July 22, 1952.

Machine for Grinding Chocolate Employing Rotor With Open-End Radial Slots and Fitted Grinding Bars Outwardly Urged by System of Resiliant Flexible Bands—J. McIntyre, Portobello, Scotland. No. 2,604,270. July 22, 1952.

Want more information on any of these recent patents? If so, you may obtain detailed printed copies by writing direct to the U. S. Patent Office, Washington, D. C., giving serial numbers of those you want and enclosing 25¢ for each copy.

NEW TIMKEN® BEARING PILLOW BLOCK



First application of new tapered bore TIMKEN® bearing makes new Dodge-Timken pillow block more compact

IT takes up less space. It weighs less. Yet the new Dodge-Timken* All-Steel pillow block has tremendous load-carrying capacity.

It's the result of the combined achievements of the Dodge Manufacturing Corporation, Mishawaka, Indiana, and The Timken Roller Bearing Company and makes use of an entirely new Timken bearing. Never before has a self-aligning, non-adjustable tapered roller bearing with tapered bore been used in pillow blocks.

Being of all-steel construction, this new Dodge-Timken pillow block is more compact and fills a real need where space is a factor. It is available in both expansion and non-expansion designs. And it incorporates all the advantages of Timken tapered roller bearings.

Because of their tapered construction, Timken bearings take radial and thrust loads in any combination. Line contact between rollers and races gives Timken bearings load-carrying capacity to spare. Timken bearings are made of the finest steel ever developed for tapered roller bearings—Timken fine alloy steel—and under normal conditions will last the life of the machinery with which the pillow blocks are used.

When you install new Dodge-Timken pillow blocks, you can expect dependable performance because the bearings are the best. No other bearing can give you all the advantages you get with Timken bearings. Specify them for all your other machinery, too. Look for the trade-mark "Timken" on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.

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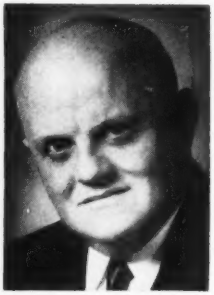

Sidney D. Kirkpatrick, editorial director of "Chemical Engineering" and "Chemical Week", and consulting editor of "Food Engineering", was recently made an honorary member of the American Institute of Chemists.

Industry

American Biscuit & Cracker Co. will construct plant at Tacoma, Wash., this winter. Production slated: 1,000,000 lb. per month.

American Meat Institute has re-elected H. H. Corey, president of Geo. A. Hormel & Co., its board chairman. Others elected to board: J. M. Foster, John Morrell & Co.; J. H. Bryan, Bryan Bros. Packing Co.; W. A. Barnette, Greenwood Packing Plant; L. F. Miles, Peyton Packing Co.; and L. F. Long, Cudahy Packing Co.

Brockport Vinegar Co., Brockport, N. Y., is now property of Brockport Processing Corp. Price: $97,000.

Brunswick Enterprises is new name of shrimp-packing concern merging Jekyll Island Packing Co., Colter Corp., and Golden Isles Canning Co. Assets: $1,250,000.

Cudahy Packing Co. will construct a packing plant in Los Angeles next year.

Eagles Candies, Columbus, Ohio, has been incorporated following completion of its expansion program. Capitalization: $150,000.

Hogg Oyster Co., Wicomico, Va., will shortly erect an oyster cannery at Gloucester, Va.

E. E. Horgan Co., Salem, Ore., has been formed to put up fish and fish products in glass containers. Capitalization: $60,000.

Hunt Foods Inc. completes first half of its warehouse and shipping center, Hayward, Calif., this fall. Cost to date: $1,000,000.

Hygrade Food Products Corp., Brooklyn, completed acquisition of Kingan & Co., Indianapolis meat packer, with confirmation Oct. 10 of $7 million stock deal for controlling interest (FE Oct., p. 214). H. F. Staub, Hygrade v.-p., becomes Kingan president. It is stated Kingan concern's operating identity will be maintained; W. R. Sinclair continues as board chairman, and T. Sinclair, former managing director, Bellfast branch, becomes executive v.-p.

Kellogg Co. opened its ninth plant at San Leandro, Calif.

Legrade Inc., meat packing plant in Quebec City, recently suffered a fire. Damage: $1,000,000.

National Dairy Products Corp. is planning capital expenditures of $22 million in 1953.

Planters Nut & Chocolate Co. has begun construction of a plant in San Francisco. Cost: $2,000,000.

Richmond-Chase Co., San Jose, Calif. lost a dried fruit plant in Edenvale, Calif., by fire. Loss: $250,000.

Seven-Up Bottling Co. of Little Rock, Ark. was recently incorporated. Capitalization: $300,000.

Dr. Zoltan I. Kertesz, former editor of "Food Technology", published by Institute of Food Technologists, and a professor at N. Y. State Agricultural Experiment Station, Geneva, has been granted a year's leave to be director of food research under the Technical Assistance Program of the Food and Agriculture Organization of the U. N. to Ceylon.

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(Patent Applied For)

Versatility

You can freeze various sized packages in the one load.

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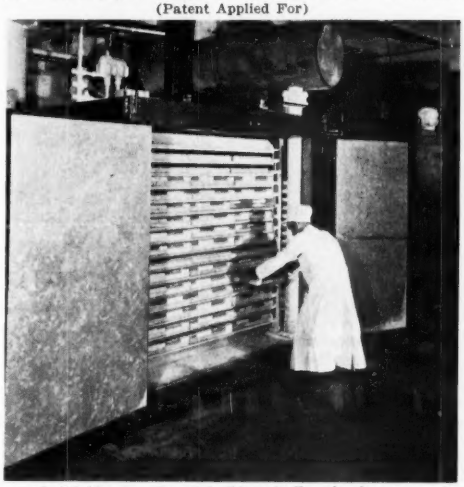

Economy

Lower power consumption per pound of product. Maintenance costs practically zero.

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The remarkably fast freezing results in full flavor and quality retention.

"Contacts"

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Frank A. Whittall succeeds Harry A. Rapelye, retired, as president of Continental Can Co. of Canada, Ltd.

Personnel

Dr. Philip K. Bates, research biologist, has been named general manager of research for Carnation Co.

B. Rionda Braga has been elected president of Francisco Sugar Co., succeeding George E. Crawley.

Frank Christenson of Refractory & Insulation Corp., N. Y., is new president and chairman of the Industrial Mineral Fiber Institute.

Dr. Robert B. Dean has joined the Borden Co.'s chemical division as chief analytical chemist.

Malcom B. Edwards, South Bend, Wash., is now president of Pacific Coast Oyster Growers Assn.

George S. Fabel is newly elected president of Thermoid Co.

Nathan Fox has been appointed director of research for Chun King Sales, Inc., Duluth, maker of Oriental-American foods.

Dr. C. L. Hankinson is now director of research at North American Creameries.

Adolf Heck replaces John R. Deane as president of Italian Swiss Colony, St. Helena, Calif.

Joseph F. Heil, Jr., now is special sales representative for Heil Co., Milwaukee.

Bernard C. Hoag has been appointed general manager of Franklin Brewing Co., Columbus, Ohio, now owned by City Products Corp.

Robert G. Holland has become manager of the Rich Ice Cream Co.'s new plant at Rochester, N. Y.

Edward O. Lafreniere, Allenton, R. I., is new president of Northeastern Poultry Producers Council.

Donald H. Little has been made manager of sanitation control for Rosenberg Bros. & Co., San Francisco.

Dr. E. V. McCollum was recently honored by the Dairy Shrine Club for his work in the discovery of vitamins A, B, and D.

George G. Montgomery has been elected a director of Dole Hawaiian Pineapple Co., Ltd., replacing Herbert E. Gray, resigned.

J. O. Reinecke, president of J. O. Reinecke & Assoc., is newly elected president of the Society of Industrial Designers.

Edward C. Roney, Detroit, has been made a director of Altes Brewing Co. He is also vice-president and director of La Salle Wines & Champagne Inc.

D. A. Ross is new president and general manager of Canada Bread Co., Ltd., succeeding A. V. Loftus, now board chairman.

Philip F. Sherman has been elected vice-president and secretary of Pillsbury Mills, Inc.

Emil G. Sick now heads board of Sick's Seattle Brewing & Malting Co. and Sick's Spokane Brewery, Inc.

Herbert A. Stratford is new executive vice-president of the Morton Salt Co.

John A. Summerton has been elected president and chief executive officer of the American Crystal Sugar Co.

Associated Industry

Apex Chemical Mfg. Corp., Detroit, maker of cleansing compounds, has elected John T. Ott president.

Edythe B. Belmont is newly-named packaging consultant for Lever Brothers Co.

Specialists in stainless tubing and pipe...

DAMASCUS TUBE COMPANY

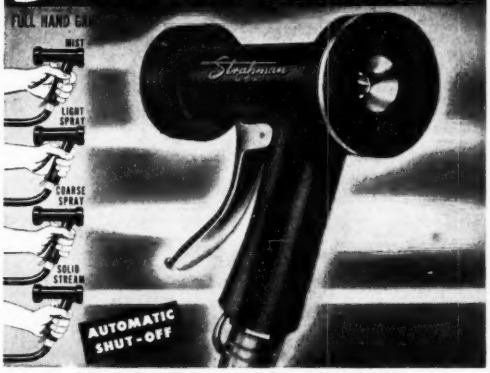
STAINLESS STEEL TUBING AND PIPE

GREENVILLE, PENNSYLVANIA

SALES REPRESENTATIVES

PHILADELPHIA, PAUL L. FAIR
PITTSBURGH, H. W. MOLLISON
CLEVELAND, DENTON & ANDERSON CO.
CHICAGO, STEEL MILL PRODUCTS CO.
DETROIT, DENTON & ANDERSON CO.
CINCINNATI, S. E. ANNING CO.
SAN FRANCISCO, R. E. SCHLENDORF CO.

Strahman AUTOMATIC WATER-SAVER SPRAY NOZZLE



Ideal for Dairy and Food Industries

The Strahman Spray Nozzle does a better job with the least amount of water. This precision made nozzle enables the operator to get any type stream of water to do his job by simply pressing the lever. A soft spray is sent forth with slight pressure on the lever, and a strong straight stream may be had by pushing the lever all the way down. This convenient control of the wash water assures better cleaning with a lot less effort. The nozzle automatically shuts off the moment the lever is released, thereby eliminating all waste of water. *List Price $17.50*

RENEWABLE RUBBER COVER. The sturdy cover protects the nozzle and your equipment against knocks and dents. When the cover becomes worn, replace it with a new one.

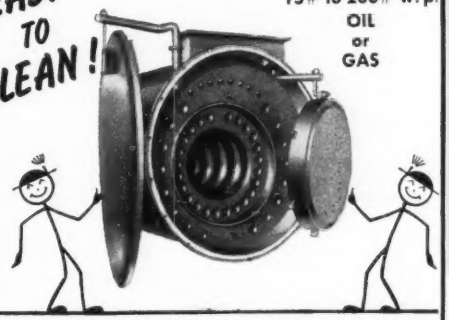
CONSULT YOUR DEALER

STRAHMAN VALVES, INC., 16 HUDSON STREET, NEW YORK 13, N. Y. U. S. A.

AMESTEAM GENERATOR

EASY TO CLEAN!

10 to 500 h.p.
15# to 200# w.p.
OIL or GAS

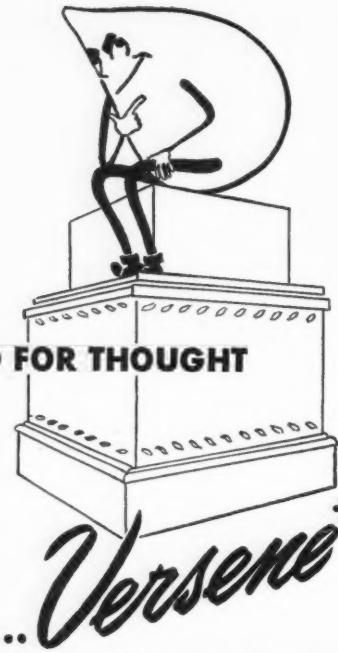


To Completely Expose Furnace and All Tubes . . . Open One-Piece Rear Flue Cover . . .

Then Open One-Piece Rear Baffle. There are Ample Clean-Out Doors in Front End, too!

AMES IRON WORKS
INCORPORATED
Box F-11, Oswego, N. Y.

Builders of Better Boilers Since 1848



FOOD FOR THOUGHT

...Versene*

VERSENE* PROTECTS BOTH PRODUCT & PROCESS

Every day more and more spoilage of processed food is being traced to metallic ion contamination. Food chemists know that the best way to prevent it is through the use of Versene. This powerful Chelating Agent controls troublesome Cations by keeping them in soluble complex form. Thus does it prevent "tinny" taste, discoloration, rancidity, loss of shelf-life, fragrance and flavor.

VERSENE*-TOXICITY TESTED

Years of toxicological research, in accordance with suggested procedures of the FDA, prove the safety of Versene when used to prevent metallic ion contamination. When added in the small quantities needed Versene is colorless, odorless and tasteless. Versene is made only by the Bersworth Chemical Company under processes originated, developed and patented by F. C. Bersworth.

VERSENE*-SAFEGUARDS SATISFACTION

Brand satisfaction depends on consistent quality. Versene controls the metallic contaminants that cause spoilage in either process or package. Because it can insure goodness it is worth investigation. Versene has exceptional stability at all temperatures and pH's. Uniformity of complexing power and quality of manufacture are guaranteed. Because of its remarkable synergistic action with quarternaries Versene is ideal for cleaning food processing equipment. Ask for sample and Technical Bulletin No. 2. Write Dept. T.

VERSENE* WATER TEST KIT. Tells Total Hardness in 2 minutes. Accurate to 1 grain per gal. Versenate Method. Complete with instructions $5.00 Postpaid.
*Trade Mark Registered

"CHEMISTRY'S MOST PRECISE CHEMICALS"

BERSWORTH CHEMICAL CO.
FRAMINGHAM, MASSACHUSETTS

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George Mann & Co., Inc. – Providence, R. I. • Wasatch Chemical Co. – Salt Lake City
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Siegel Chemical Co. – Brooklyn, N. Y. • C. S. Tanner Co. – Charlotte, N. C.
Barada & Page, Inc.
Dallas – Houston – New Orleans – Oklahoma City – St. Louis – Tulsa – Wichita

James F. Parsons, Jr., is now sales manager for the Economic Machinery Co., Worcester, Mass., division of Geo. J. Meyer Mfg. Co. (By error, this release appeared with a picture of Ray Dubrowin—FE, Sept., p. 222—who has been made associate manager of the sales promotion department for the National Biscuit Co.

Carpenter Steel Co. is increasing production capacity 40 percent at its Alloy Tube Div. in Union, N. J., where it makes stainless steel pipe and tubing.

Continental Can Co. is slated to start construction of a metal container plant in Omaha this month.

Crown Can Co., subsidiary of Crown Cork & Seal Co., Inc., has made George W. Crabtree a vice-president.

Dominion, Scott, Barron Ltd. is new company combining Canadian and U. K. firms for manufacture of processing equipment for food and other industries. President is Edgar E. Ritcey.

Engineering Research Assoc., Inc., St. Paul, has appointed Carl E. Swanson senior scientist.

Heyden Chemical Corp. announces appointing J. P. Remensnyder chairman, Simon Askin president, and Barrett Brown director.

Macwhyte Co. has made directors of E. C. Berg, G. Johnston, and M. A. Buntrock.

National Research Corp. recently made Wayne H. Keller director of its chemistry department.

Oliver Corp., Chicago, has purchased resources and facilities used by Carter Industries, Cincinnati, in the making of gravity conveyors.

Owens-Illinois Glass Co. announces it may erect a glass container plant at Portland, Ore.

Phoenix Industries, Inc., now has its Indianapolis plant producing aluminum foil containers for baked, pre-cooked, and other food products prepared similarly.

Deaths

Edward E. Ames, 71, retired chairman of General Box Co.—Sept. 28.

George P. Ballachey, 67, former owner of Margaret Burnham Candy Co., Oakland, Calif.—Aug. 13.

Edward F. Carlson, 57, assistant vice-president of Red Star Yeast & Products Co.—Sept. 29.

A. E. Coddington, 64, president of Coddington Packing Co., Inc., Indianapolis.—Aug. 17.

Frederick L. Curtis, 84, retired vice-president of Raybestos-Manhattan, Inc.—Sept. 20.

Frank Gerber, 79, chairman of Gerber Products Co.—Oct. 7.

Edward Lawrence Greene, 68, president of National Better Business Bureau.—Sept. 27.

D. F. Hahn, 52, director, vice-president and production manager of General Box Co.—Sept. 23.

Isaac Miller Hamilton, 87, chairman of Illinois Canning Co., Hoopeston, Ill.—Aug. 11.

Harry R. Leonard, 64, founder and general manager of Twin City Milk Producers Assn.—Aug. 30.

John M. Powell, 54, manager of Swift & Co.—Sept. 19.

Jack W. Storfold, 37, president of Intercoastal Fisheries and vice-president of Storfold & Grondahl Packing Co., Seattle.—Sept. 20.

Thomas H. McInnerney, founder and chairman emeritus of the National Dairy Products Corp., passed away Sept. 30 at the age of 85.

Just Off the Press

New Catalogs and Bulletins
from manufacturers of equipment and supplies
— Free For The Asking —

Food Plant Equipment

Process Pumps

Light refinery liquids at temperatures to 250 deg. F. may be conducted via process pumps shown in Catalog 7094. Detailed descriptions of units are noteworthy. 16 pages.—*Ingersoll-Rand Co., 11 Broadway, New York 4.*

Circle L223A on Reader Service Card

Multi-Louver Dryer

Quantity of information on drying, cooling, and processing of bulk materials accompanies description of multi-louver dryer in Catalog 2409. 24 pages.—*Link-Belt Co., 307 N. Michigan Ave., Chicago 1.*

Circle L223B on Reader Service Card

Portable Compressor

New 600 cfm. portable compressor is topic of Foldout 2310-B. Stated to be compact, weighing 9,500 lb., and matched to high-powered diesel engine. 8 pages.—*Ingersoll-Rand, 11 Broadway, New York 4.*

Circle L223C on Reader Service Card

Centrifugal Drives

Latest *Synchronizer*, No. 36, deals with centrifugal refrigeration drives. Discusses characteristics from standpoint of capacity and control. 24 pages.—*Electric Machinery Mfg. Co., Minneapolis 13.*

Circle L223D on Reader Service Card

Steam Generators

Factory assembled steam generators combining 2-drum water tube boiler, integral water cooled furnace, insulation, etc., in sizes to 3,000 sq. ft. h.s. are herein described. 20 pages.—*Erie City Iron Works, Erie, Pa.*

Circle L223E on Reader Service Card

Pipeline Traps

Magnetic pipeline traps are featured in Brochure B-203. Claimed to afford protection to processing equipment, e.g., pumps, screens, grinders, fillers, and other units. 4 pages.—*Eriez Mfg. Co., Erie, Pa.*

Circle L223F on Reader Service Card

Proportioning Pumps

Designed for laboratory and pilot plant work, proportioning pumps described in Bulletin 15 are for metering free-flowing liquids. 4 pages.—*Brosites Machine Co., Inc., 50 Church St., New York 7.*

Circle L223G on Reader Service Card

Water Treatment Units

Electromatic water treatment units for the prevention of scale and corrosion in boilers and hot water systems are topic of new bulletin. 4 pages.—*Electromatic Water Treatment, Inc., 475 Fifth Ave., New York 17.*

Circle L223H on Reader Service Card

Motor Drives

Subject of Bulletin AS-1600-B6 is motor drives of 1/3 to 7½ hp. 16 pages. — *Worthington Corp., Harrison, N. J.*

Circle L223I on Reader Service Card

Fish Meal Dryer

Low temperature fish meal dryer is described and applications given in Bulletin 523. 8 pages.—*Standard Steel Corp., 5045 Boyle Ave., Los Angeles 58.*

Circle L223J on Reader Service Card

Induction Motors

Large wound-rotor and squirrel-cage polyphase induction motors are presented in Bulletin 37-200. 6 pages.—*Electric Products Co., 1725 Clarkstone Rd., Cleveland 12.*

Circle L223K on Reader Service Card

Centrifugal Pumps

Factual Bulletin, 3,800 describes two pumps of the vertical, centrifugal, wet-pit-pump type. 24 pages. — *Yeomans Bros. Co., 1999-A. N. Ruby St., Melrose Park, Ill.*

Circle L223L on Reader Service Card

Steam Plant Apparatus

Treated in Bulletin G-1307 is steam plant apparatus including blow-off valves, water columns, gages, steam traps, strainers, and other units. 12 pages.—*Yarnall-Waring Co., Chestnut Hill, Philadelphia 18.*

Circle L223M on Reader Service Card

Steel Boiler

Round, steel boiler for oil, gas, or stoker firing is discussed in Bulletin 92. 4 pages.—*Kewanee-Ross Corp., Kewanee, Ill.*

Circle L223N on Reader Service Card

"Steam" Refrigeration

Basic principles involved in

SPRAY NOZZLES
PNEUMATIC ATOMIZING NOZZLES
LIQUID
. . . FOR EVERY NEED!
CLIP AND MAIL
For lower cost and more efficient spraying try Spraying Systems Spray Nozzles. Complete type and size selection for every need. Write for Catalogs.
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Fact of the Month:
Use Spices, Naturally
NATURAL SPICES MIX THOROUGHLY WITH FOOD PRODUCTS
Ground, natural spices disperse completely and smoothly in foods. Nature-protected flavor makes mixing formulas easy. Processors are assured of constant quality in their products by the locked-in flavor components of natural spices.
AMERICAN SPICE TRADE ASSOCIATION
82 WALL STREET NEW YORK 5, N. Y.

the "VORTEX" Cools Preserves

FOR ANOTHER LEADING FOOD PRODUCER

It's Automatic, Continuous — Cuts Processing Costs!

The Kroger Co., one of many prominent food processors, uses the famous Barry-Wehmiller Vortex machine to cool preserves in its Cincinnati, Ohio plant. Because Kroger wanted to sterilize the head space between the closure and top of product, Barry-Wehmiller engineers incorporated a bank of infra-red lights in the design of the machine.

Here is another example of the adaptability of the Vortex to meet many requirements. It is successfully being used as a cooler, freezer, pasteurizer or exhaust box. Whatever its use, the Vortex will increase production and lower costs with an entirely automatic operation.

Barry-Wehmiller's knowledge of engineering and food technology added this sterilization feature to the proven advantages of the "walking beam" conveyor, atomized spray system of heat transfer and low power hydraulic drive. Write for bulletin and complete information on how the Vortex can be engineered to solve *your* problems as well as improve your processing and lower your costs.

THE SUN NEVER SETS ON BW BOTTLE CLEANERS, PASTEURIZERS & PROCESSORS

BARRY-WEHMILLER MACHINERY CO.

4660 WEST FLORISSANT AVENUE • ST. LOUIS 15, MO.

IN GREAT BRITAIN BW BARRY-WEHMILLER MACHINERY LTD. MILL GREEN ROAD, MITCHAM JUNCTION, SURREY

BW-288

steam vacuum refrigeration are given in well-illustrated Bulletin 60A. Lists advantages of applicable equipment. 20 pages.—*Graham Mfg. Co., Inc., 415 Lexington Ave., New York 17.*

Circle L223O on Reader Service Card

Soft Water Producers

Equipment for producing soft water via conditioning methods is outlined in recent pamphlet. 4 pages.—*Uniflow Mfg. Co., Erie, Pa.*

Circle L225A on Reader Service Card

Control Equipment

Pressure Gages

Indicating and recording pressure gages with electric contact control are furnished as indicating or single-pen recording controllers according to Pamphlet 709. 4 pages. — *Minneapolis-Honeywell Regulator Co., Wayne & Windrim Aves., Philadelphia 44.*

Circle L225B on Reader Service Card

Tachometer Heads

Measuring low speeds—rotational or linear—is function of heavy duty tachometer heads described in Bulletin 57M. 4 pages. —*Metron Instrument Co., 432 Lincoln St., Denver 9.*

Circle L225C on Reader Service Card

Water Filters

Pressure-type water filters for removal of visible suspended matter from water are noted in Bulletin WC-107. 12 pages.—*Graver Water Conditioning Co., 216 W. 14th St., New York 11.*

Circle L225D on Reader Service Card

Valve Data

Series of dimensional data sheets on line of valves for fluid control is presented in new booklet. 18 pages.—*Hoke, Inc., 277 S. Dean St. Englewood, N. J.*

Circle L225E on Reader Service Card

Gages, Valves

Complete line of liquid level gages, valves and associated equipment is contained in Bulletin 180. 4 pages.—*Jerguson Gage & Valve Co., 80 Fellsway, Somerville 45, Mass.*

Circle L225F on Reader Service Card

Electrical Computer

Bulletin CEC-1802A gives data on electrical computer for rapid solution of simultaneous linear equations. 4 pages.—*Consolidated Engineering Corp., 300 N. Sierra Madre Villa, Pasadena 8, Calif.*

Circle L225G on Reader Service Card

Hydraulic Controller

Information is given in Bulletin 157 on hydraulic controller for positioning. May be used with valves, rheostats, etc., and for indicating level, flow, and static pressure of units. 12 pages.—*Farris Hydrotorque Corp., Palisades Park, N. J.*

Circle L225H on Reader Service Card

Laboratory Supplies

Operators of dairy products laboratories will be particularly interested in catalog on laboratory supplies. Wide scope is covered. 40 pages.—*Cherry-Burrell Corp., 427 W. Randolph St., Chicago 6.*

Circle L225I on Reader Service Card

Magnetic Stop Valve

Leaflet presents facts on magnetic stop valve for refrigeration control and air conditioning.—*General Controls, 801 Allen Ave., Glendale 1, Calif.*

Circle L225J on Reader Service Card

Instrumentation Jacket

Material citing instruments specifically for food industry has been collected and inserted in attractive jacket. — *Minneapolis-Honeywell Regulator Co., Wayne & Windrim Aves., Philadelphia 44.*

Circle L225K on Reader Service Card

Purity Meter

Folder 125 discusses purity meter, an electronic testing device for determining purity of distilled or demineralized water. 6 pages. —*Barnstead Still & Sterilizer Co., 2 Lanesville Terrace, Forest Hills, Boston 31.*

Circle L225L on Reader Service Card

Volt-Ammeter

Small folder offers data on a.c. volt-ammeter complete with voltage leads and carrying case. 6 pages.—*Columbia Electric Mfg. Co., 4519 Hamilton Ave., Cleveland 14.*

Circle L225M on Reader Service Card

Laboratory Furniture Kit

Unique kit permits installation of laboratory furniture via use of scaled cut-outs representing furniture dimensions. No need for blueprints is cited advantage.—*Fisher Scientific Co., 717 Forbes St., Pittsburgh 19.*

Circle L225N on Reader Service Card

Materials Handling

Standardized Conveyors

Reprint of Bulletin FE-63C includes new material and information on 11 standardized conveyors. Both gravity and power units given. 28 pages.—*Standard Conveyor Co., N. St. Paul 9.*

Circle L225O on Reader Service Card

Overhead Tramrails

Booklet 2008-H details 15 advantages in use of overhead tramrails. 12 pages.—*Cleveland Tramrail Div., Cleveland Crane & Engineering Co., 1036 E. 289th St., Wickliffe, Ohio.*

Circle L225P on Reader Service Card

Don't Waste Tons!
Maintain Peak Refrigeration Efficiency with
PHILLIPS FLOAT CONTROLS

SERIES 300 PHILLIPS FLOAT CONTROLS
- SERVICEABLE—No pump down needed to inspect or renew cartridge.
- ADAPTABLE to most types of flooded evaporators
- COMPACT—mounts directly in surge drum.

Phillips Float Controls are available in capacities of 1 to 1000 tons for "Freon" and 1 to 2000 tons for ammonia. Consult with Phillips engineers on applications of Phillips Float Controls for your present equipment or specifications on new units. Just call on us . . . we'd like to help.

Write for Catalog

H. A. PHILLIPS & CO. DESIGNERS AND ENGINEERS REFRIGERATION CONTROL SYSTEMS
3255 W. CARROLL AVENUE • CHICAGO 24, ILLINOIS

Representatives: The C & S Equipment Co., 2103 S. San Pedro St., Los Angeles, Cal.
Mason Emanuels Co., 90 Dearborn St., Seattle 4, Wash.

Here's Why—

THE E-Z ADJUST TOMATO PULPER IS YOUR BEST PULPER BUY!

- PRODUCES TWICE THE VOLUME of ordinary pulpers of comparable size.
- NO DOWN TIME NEEDER for making adjustments to regulate moisture in pomace. Machine can be *adjusted instantly while in operation.*
- POWER COSTS ARE LOWER
  Model "A"—25-50 tons per hr. capacity with 10 h.p. motor
  Model "B"—12-25 tons per hr. capacity with 7½ h.p. motor
- HIGH QUALITY PRODUCT MAINTAINED
  Immediate adjustment feature gives effective control over quality of product.
- RUGGED CONSTRUCTION
- COMPLETELY SANITARY

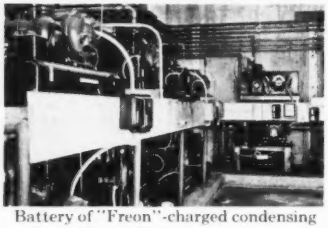
WRITE TODAY FOR COMPLETE STORY TO:

F. H. LANGSENKAMP COMPANY

236 E. South St. Indianapolis, Indiana

"FREON"-operated units help boost super market sales

Meat cooler measures 19' by 32' and is one of the largest in the market area.



Battery of "Freon"-charged condensing units in Rapp's Market.

Modern refrigeration at work in St. Louis store

By preserving perishables and increasing customer satisfaction, refrigeration helps to step up sales and serve customers better. "Freon"-charged installations enable retailers to seal product freshness in refrigerated rooms and cases.

A perfect example is seen in Rapp's Market, St. Louis, Mo. Here, "Freon"-operated Hussmann equipment is used to maintain proper temperatures in coolers and display cases for storing and merchandising various perishable foods. This ultra-modern supermarket—one of a chain of five—features attractive, sales-boosting displays of meats, ice cream, produce, dairy foods and frozen products. Neat rows of refrigerated cases increase sales appeal and invite extra purchases.

The market also has a produce cooler, a meat cooler and refrigerated meat-cutting room. "Freon"-charged units maintain temperature and humidity controls—an important factor in food retailing.

"Freon" refrigerants are ideal throughout the food industry in processing, shipping, storing and selling. These refrigerants are safe . . . noncombustible, nonexplosive and virtually nontoxic . . . harmless to foods, fabrics and finishes.

These are some of the important reasons why manufacturers, engineers and contractors in the air conditioning and refrigeration fields heartily recommend "Freon"-operated equipment. Whether your job is processing food or selling it, there are many fine machines available to suit your needs. E. I. du Pont de Nemours & Co. (Inc.), "Kinetic" Chemicals Division, Wilmington 98, Del.

KINETIC

"FREON" *safe refrigerants*

DU PONT
REG. U.S. PAT. OFF.

"Freon" is Du Pont's registered trade-mark for its fluorinated hydrocarbon refrigerants.

150th Anniversary

BETTER THINGS FOR BETTER LIVING...*THROUGH CHEMISTRY*

Wrapping Machinery

Built especially for seafood packers, automatic wrapping machinery is outlined pictorially in new folder. Advantages cited. 4 pages.—*Hayssen Mfg. Co., Sheboygan, Wis.*

Circle L227A on Reader Service Card

Varied Conveyors

Feed tables, invertors, elevators, unscramblers, and other conveyor-type units useful in varied operations are described in leaflet.—*Chisholm-Ryder Co., Hanover, Pa.*

Circle L227B on Reader Service Card

Packaging Machines

Pictorial presentation on packaging machines includes supplementary factual data. 4 pages.—*Package Machinery Co., Springfield, Mass.*

Circle L227C on Reader Service Card

Electric-Lift Trucks

Catalog 34 notes features of varied electric-lift trucks. Included are platform and pallet types. Well documented. 20 pages.—*Lewis-Shepard Products Inc., Watertown 72, Mass.*

Circle L227D on Reader Service Card

Fork-Lift Trucks

Analysis of specific fork-lift-truck operating features is keynote of Bulletin DMF-2. Covers all aspects from mast to axle. 8 pages.—*Towmotor Corp., 1226 E. 152nd St., Cleveland 10.*

Circle L227E on Reader Service Card

Anent Conveyors, Accessories

Pocket-sized pamphlet details facts on conveyors and accessories. Many types offered. 12 pages.—*Metzgar Co., Grand Rapids 4, Mich.*

Circle L227F on Reader Service Card

Overhead Lifts

Safely rated for 8,000 and 10,000 lb. cradle-load capacities respectively, are distinctions of two overhead lifts given in recent foldout. Mention is made of other units. 6 pages.—*Kewanee Machinery & Conveyor Co., Kewanee, Ill.*

Circle L227G on Reader Service Card

Refrigerated Bodies

Three refrigerated body styles for trucking perishables are noted in new folder. 6 pages.—*Batavia Body Co., Batavia, Ill.*

Circle L227H on Reader Service Card

Handling Work

Material Handling is title of valuable work outlining proven procedures for safe, expeditious handling of materials. 20 pages.—*Material Handling Institute, Inc., 1108 Clark Bldg., Pittsburgh 22.*

Circle L227I on Reader Service Card

Bag Sealing Machine

Automatic bag sealing machine is topic of recent leaflet.—*Amsco Packaging Machinery, Inc., 31-31 48th Ave., Long Island City, N. Y.*

Circle L227J on Reader Service Card

Hydraulic Lift

Manually propelled hydraulic lift is detailed in new brochure. Uses and economies are noted.—*Century Products Co., 5925 Highway 7, Minneapolis 16.*

Circle L227K on Reader Service Card

Plant Supplies

Foam-Like Product

Well-illustrated bulletin presents data on foam-like product (polystyrene plastic) and its general properties and uses. 20 pages.—*Plastics Dept., Dow Chemical Co., Midland, Mich.*

Circle L227L on Reader Service Card

Roller Printer

Compact roller printer for marking crates, boxes, etc., has interchangeable type among other features. Material well presented. 8 pages.—*Algene Marking Equipment Co., 324 W. 26th St., New York 1.*

Circle L227M on Reader Service Card

Brick Grease Lubrication

Lubrication for flour mill bearings is provided via brick grease described in Bulletin 52. Applications to other bearings are noted. 4 pages.—*Keystone Lubricating Co., 21st & Lippincott Sts., Philadelphia 32.*

Circle L227N on Reader Service Card

Protective Coating

Protecting and restoring masonry structures are purposes effected by use of new-type protective coating. 20 pages.—*Arco Co., 7301 Bessemer Ave., Cleveland 27.*

Circle L227O on Reader Service Card

Glove Leaflet

Oils, greases, and lubricants may readily be handled when wearing special working gloves, described in recent leaflet.—*Plasticote Glove Co., Inc., 102 E. Walnut St., Milwaukee 12.*

Circle L227P on Reader Service Card

Construction Material

Compound of unplasticized polyvinyl chloride is stated useful when fashioned into pipe, containers, tanks, acid pumps, valves, and other units requiring resistance to corrosion. 4 pages.—*American Agile Corp., P. O. Box 168, Bedford, Ohio.*

Circle L227Q on Reader Service Card

Pipe Identification

Cables, conduits, or pipes may be identified simply by adhesive stickers imprinted with particular unit's function. 4 pages.—*West-*

WELLS, PUMPS—
COMPLETE WATER
SUPPLY UNITS

Layne puts a lot of extra ruggedness into the construction of their well and pump installations. This means that there is seldom repair expense of any kind for years to come. And matching ruggedness is the widely known and acknowledged Layne quality.

Why not have Layne install a water well supply on your property? The saving in water cost will more than justify the expense. For further information, catalogs, etc., address

LAYNE & BOWLER, INC.
General Offices, Memphis 8, Tenn.

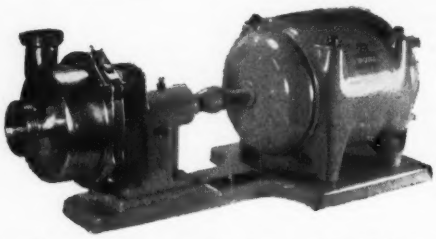
Layne
WATER WELLS
VERTICAL TURBINE PUMPS
WATER TREATMENT

Here are the PUMPS that will handle ANY PRODUCT that will flow to them . . .

ANY product that will flow to them can be handled efficiently and economically with Tri-Clover non-agitating centrifugal pumps. Illustrated are three of the many Tri-Clover pump models which are used for dairy and food processing, brewing and bottling, chemical and general industrial applications.

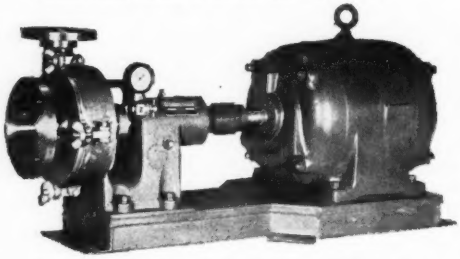
Designed for efficient liquid transmission and low cost maintenance, these pumps feature patented screw type impellers with sanitary impeller clips, inert carbon seals easily removed for cleaning, streamlined lightweight heads with a minimum of parts, and the exclusive Tri-Clamp casing construction which permits fast, easy pump assembly or disassembly.

Tri-Clover's exclusive developments are the result of over 30 years of specialized engineering experience and thorough knowledge of liquid handling. Let our engineering staff work with you in solving your pumping problems.



This model has been designed for the non-agitating, efficient pumping of milk, food products such as diced carrots, cream style corn, tomatoes, applesauce, relish and beverages. It is also practical in breweries and for the pumping of drugs and chemicals in solution.

Designed for very efficient operation at 1800 and 3600 RPM, and especially where high speeds are required, through heaters, coolers, filters, clarifiers, etc. The 3600 RPM model is especially applicable in the dairy industry, where high head and low capacity are essential and for handling low and medium viscosity liquids in the food processing industry.



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P152

line Products Div., Western Lithograph Co., Box 3804, St. Louis 22.

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Five hose types do job of 18 formerly offered. Complete statistical presentation. 8 pages.—*Thermoid Co., Trenton, N. J.*

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Corrosion-Proof Cements

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Building Insulators

Described in *Insulations for Metal Buildings* are 4 products: Preformed rigid boards, flexible Aerocor, roll blankets, and perimeter insulation. 8 pages.—*Owens-Corning Fiberglas Corp., Toledo 1.*

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Aluminum Paint

Decorative and protective are advantages given in Bulletin C-54-8 discussing aluminum-chromium paint. 4 pages.—*Monroe Co., Inc., Cleveland 6.*

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Alloy Castings

Extensive treatment on subject of alloy castings—heat and corrosion resistant—for use in industry is given in new bulletin. 48 pages.—*International Nickel Co., Inc., 67 Wall St., New York 5.*

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Infestation Controller

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Cap Screws

Bulletin 856 enumerates cap screw uses. Maker states they are heat treated for high tensile strength. 4 pages.—*Standard Pressed Steel Co., Jenkintown, Pa.*

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Window Squeegee-Scraper

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Fabricated Fittings

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Miscellaneous

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Folder containing suggestions for produce processing, packaging, refrigeration and merchandising is now available. 6 pages.—*Sylvania Div., American Viscose Corp., 1617 Pennsylvania Blvd., Philadelphia 3.*

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Safeguarding trucks and plants from fire via proper use of fire extinguishers is theme of Bulletin 55. 14 pages.—*Pyrene Mfg. Co., 564 Belmont Ave., Newark.*

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Lift-Truck Operation

Cleverly cartooned manual *How To Operate a Lift Truck* discusses materials handling. 24 pages.—*Hyster Co., Portland 8.*

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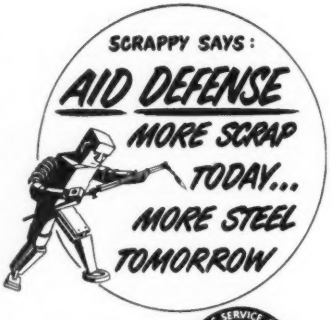

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(Continued on the following page)

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Desirable age bracket 35-45 years, with several years continuous experience.

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(Continued from preceding page)

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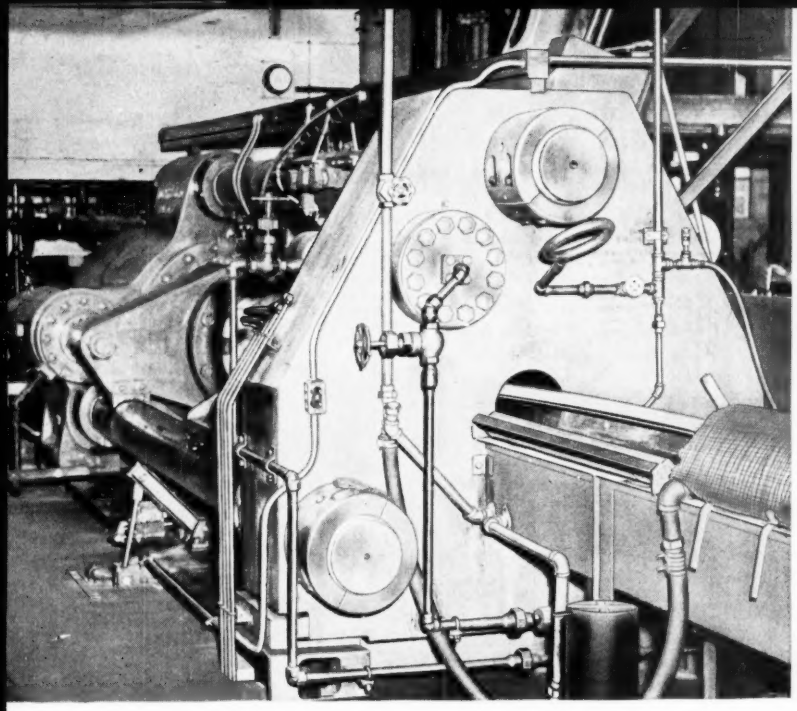

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Industrial Oil

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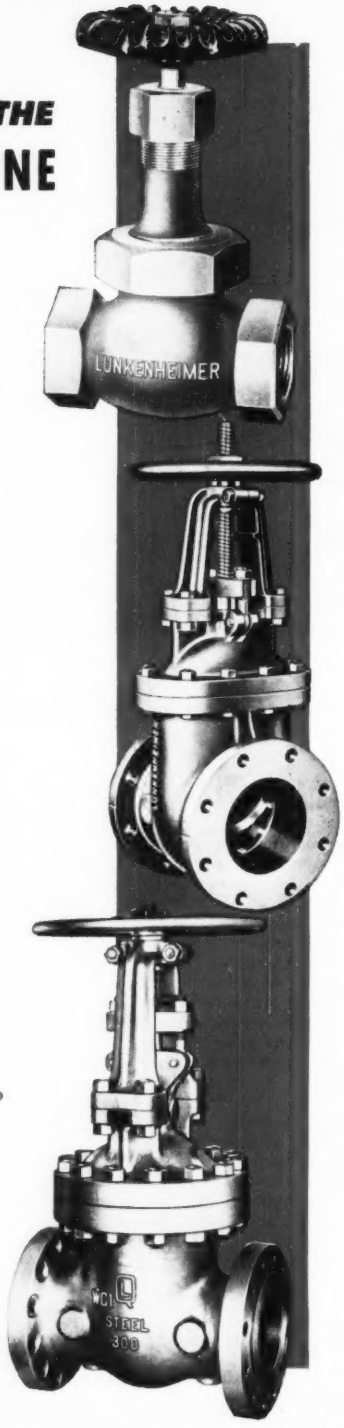

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WHAT THE NUMBERS MEAN

The number after each item in the list is the number of the page it appears on. Where more than one item is described on a page, prefix capital letters indicate position: L,R,T,B,C (left, right, top, bottom, center). Small letters are used to separate several products described in an advertisement. Capital letters following page numbers identify products and literature described in monthly editorial departments.

The same numbers appear on the postcard in numerical order.

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For Food Plant Employees and Consultants Only

Circle the numbers of the items — editorial or advertising — that interest you. Consult listings above and on following page for the correct number.

FOOD ENGINEERING NOVEMBER, 1952

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FREE INFORMATION SERVICE for food plant employees and consultants
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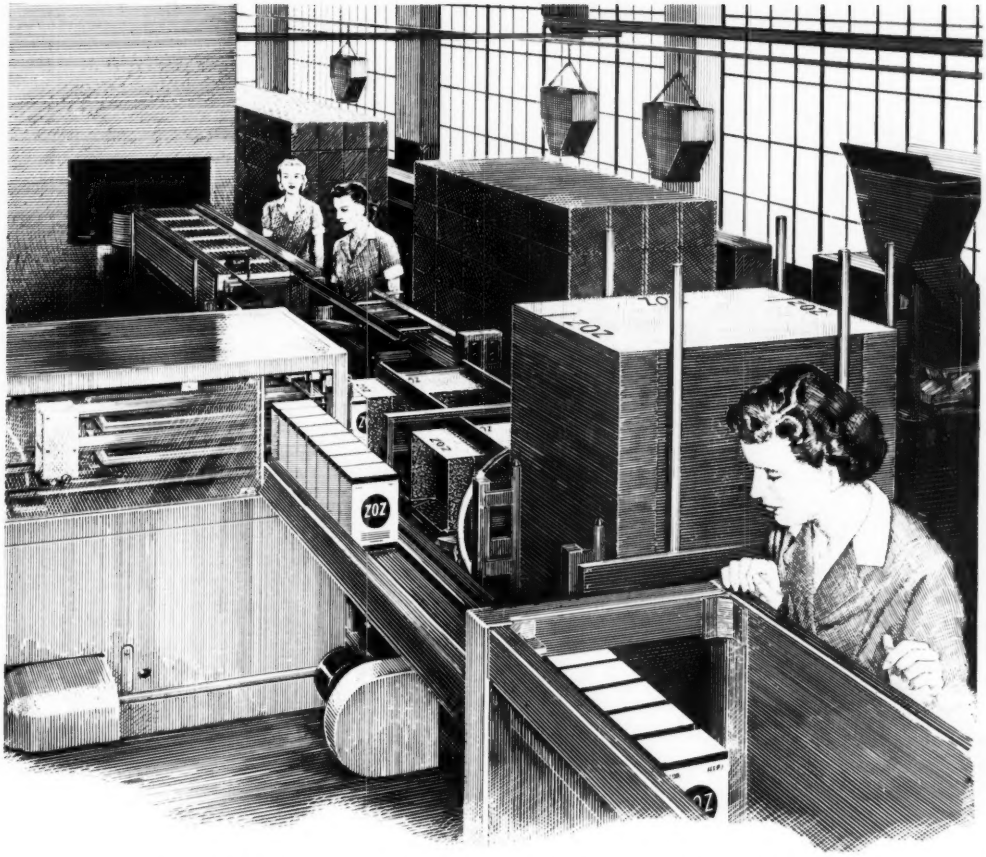
FOOD ENGINEERING
NOVEMBER, 1952



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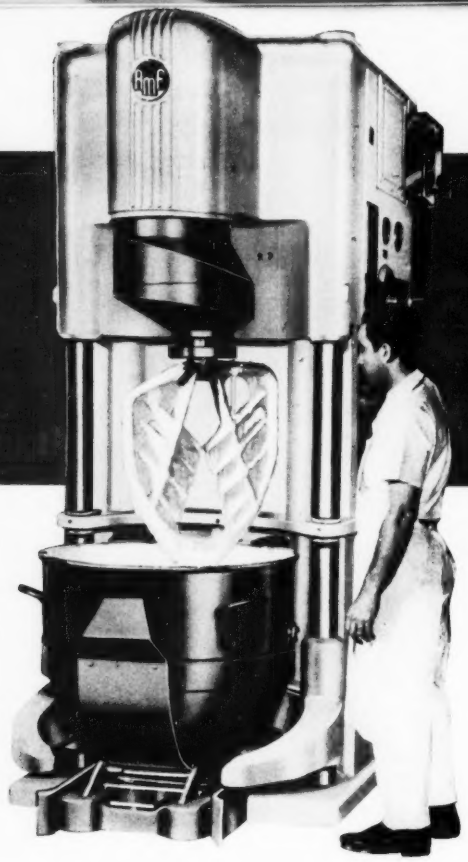

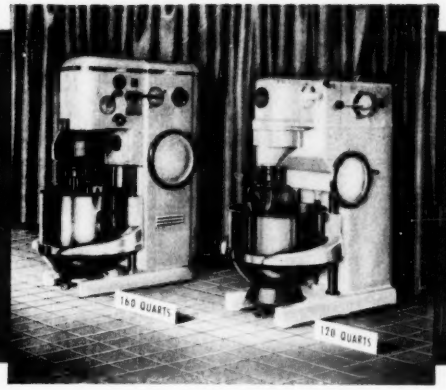

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